

**Short Version**

# ENERGY COOPERATIVES

**Comparative analysis in Eastern Partnership countries and Western Balkans**

Armenia, Belarus, Bosnia-Herzegovina, Croatia, Georgia,  
Moldova, Serbia, Ukraine

Potential of energy cooperatives to meet emission targets and supply society with affordable, safe and renewable energy and gender-sensitive participation opportunities



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Analysis for politicians and energy stakeholders

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### *List of abbreviations*

BAU	Business as usual
BiH	Bosnia and Herzegovina
BiH/RS	Bosnia and Herzegovina/Republika Srpska
CEDAW	Convention on the Elimination of All Forms of Discrimination against Women
CSO	Civil society organization
E-coops	energy cooperatives
EE	Energy efficiency
EU	European Union
FiT	Feed in tariff
FiP	Feed in premium
GEM	Gender equality mechanism
GHG	Greenhouse gas
IPCC	Intergovernmental Panel on Climate Change
kW	Kilowatt
NDC	Nationally determined contributions
NREAP	National Renewable Energy Action Plan
OP	Optional protocol (to CEDAW)
PV	Photovoltaic
RE	Renewable energy
REIC	Regional Education and Information Centre
SDGs	Sustainable Development Goals
TWh	Terrawatt hour
UNDP	UNDP - United Nations Development Programme

### *Summary: Key findings*

All target countries have ratified the Paris Agreement. Their national climate and energy goals as well as the European Union targets for renewable energy (RE) – a share of 27% and increase in energy efficiency of 30% by 2030 – are still not enough to reach (supra)national climate goals. Energy communities, and thus energy cooperatives, can have an essential role in supporting national governments and the EU to achieve their climate and energy objectives of a fossil free and socially sound transformation. This movement is helping to drive the development of local decentralised energy networks, contribute to public acceptance of the energy transition, enhance energy security and provide opportunities for local economic growth. If appropriately supported, the potential of energy communities can incentivise local implementation of energy and climate targets, sustainable development goals (SDGs) and the Paris Agreement. This study focusses on energy cooperatives as one important instrument for energy communities. Key findings are:

- Available data on energy citizen projects in the target country is rather limited. Identifying good practice cases and measuring their impact requires platforms and knowledge transfer.
- Energy cooperative projects do not stand alone, but are part of a comprehensive ‘community developing’ policy. They can foster the wider diffusion of new energy structures as technical, economic and societal models.
- There is insufficient knowledge to understand the extent to which this organisational form is able to unify a broad group of actors to promote a renewable energy system (societal power), to gather capital for elaborating renewable energy supply structures (economic power) and to meet international climate and SDG targets (ecological power).
- The few identified best practices show that in almost all target countries, energy cooperatives could be established as a successful democratic and socio-economic business model.
- The operational phase, in addition to the preparatory stage, are both very important for longstanding and successful running of energy cooperatives.
- Important factors for energy cooperative development are governance and actors variables:
  - Support mechanism for RE and legal and political framework
  - Planning policies and administration
  - Attitudes towards the cooperative model
  - Cultures and local energy activism
- The legal and political framework is VERY important for RE systems, but with cooperation, capacity building and support schemes, energy cooperatives can be pushed from bottom-up.
- The main barriers are lack of appropriate support framework, lack of financing, lack of knowledge and cooperative pilots and the strong power of monopolistic energy utility companies adhering to fossil and centralized energy systems.
- Cooperative structures encourage strong commitment of citizens, high trust, reduced transaction costs, reduced mistrust in authorities and the use of individual possibilities for sustainable development.
- Property rights in the hands of citizens are likely to enhance the cooperative model’s credibility and trustworthiness. Citizens are more likely to trust cooperatives in which they participate to dispense advice that will benefit themselves, their community and the environment. Energy cooperatives are able to garner trust from citizens and other stakeholders and support democratic models.
- A transformation of the energy system towards a renewable and decentralized energy supply needs a European dimension. Decentralized citizen’s power could significantly reduce system peaks and strengthen a European-wide power grid.

### *Background and regional scope*

This paper estimates the potential of energy cooperatives to meet emission targets and supply society with decentralized, affordable, safe and renewable energy and gender-sensitive participation opportunities in Eastern Europe and the Western Balkans. In the map below (Figure 1), the countries explored in this analysis are shaded orange.



*Geographical overview*

The five EU Eastern Partnership countries explored are: **Ukraine, Georgia, Armenia, Moldova and Belarus**, belonging to Eastern Europe, Caucasus and Central Asia (EECCA region). The covered Western Balkan countries are: **Bosnia and Herzegovina, Serbia and Croatia**. The data were gathered with surveys, interviews and desk research.

The dominant model of energy infrastructure has historically been conceived as very centralized, and even more so in the post-Soviet countries. Citizen involvement and other public participation is hardly existent. Now, a few number of citizens, non-governmental organisations and policy-makers advocate the transition towards a more decentralized configuration, involving geographically dispersed and small-scale generation units located close to consumers. Decentralized systems are said to present several advantages over centralized ones, including reduced costs for transmission and distribution systems, reduced grid power losses, more efficient data management systems and a larger share of zero-carbon technologies on the national and European level (Sims, Schock 2007). Whereas this energy transition utilising energy cooperatives and community energy projects shows different models in Germany, Denmark and Belgium, it is nearly non-existent in the target countries of this analysis. Some formal or informal citizen-led initiatives show the technical and economic feasibility of such democratic and decentralized small-scale projects. In this context, it is important to study the conditions, barriers and factors likely to foster energy cooperation and citizen participation in order to increase the share of clean, decentralized and socially sound energy production and fundamentally transition from a fossil fuel and nuclear power based system to one based entirely on renewable energy.

### *Terminology – Citizen's energy and Community energy*

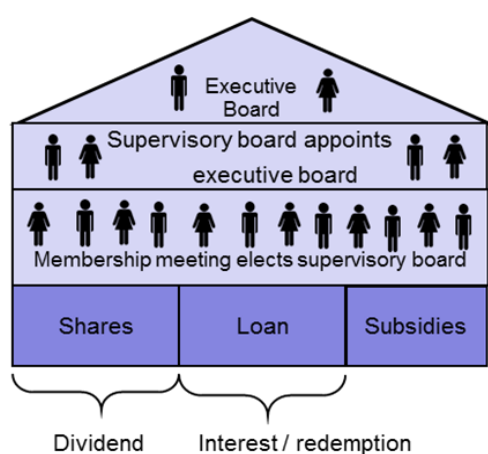
The term **Citizen's energy** is often used to describe this combination of civic participation and decentralized energy generation (based on renewable energy sources), sometimes combined with

energy efficiency. It implies that citizens previously have not been involved in the energy value chain and that organisational forms of citizen's energy radically change that fact (Hauser et al. 2015). Citizen's energy or community energy can be organised by private persons as individuals, or they can unite to plan, invest in and implement RE projects in varying corporate forms such as municipalities. Projects organised in the form of **Citizen's energy** or **Community energy** have a positive impact on the integration of citizens in sustainable economic processes, acceptance of newly built RE power plants, increased social and citizenship commitment and participation and transparency in projects. These projects also serve to tie citizens to their community and region, which has positive effects on democratic structures in society. Citizen's or community energy projects have the capability to design and change society. Energy cooperatives often have the explicit target to be tied to their regions and establish functional regional value chains (George 2012). Community-led RE projects strengthen the regional economy through reduced dependence on imports of fossil energies, which pose risks to political stability in both import and export regions, and can help alleviate the effects of demographic change in rural regions that are especially affected by the loss of jobs, infrastructure, migration into cities and a rapidly aging population (Staab 2015). E-coops offer a chance to boost "regional confidence" using regional value chains, direct visibility of investments and knowledge of local circumstances (Energieagentur Rheinland-Pfalz GmbH 2015). These initiatives are increasingly perceived as key potential actors in the transition towards low-carbon energy systems in Germany, Denmark, UK and Belgium (Seyfang, Park, Smith 2013). As incumbent actors suffer mistrust from the public, the implementation of decentralized RE installations, smart metering technologies and other energy efficiency measures need to be steered by trustworthy individuals and organisations rooted in local communities. Citizen energy enhances social acceptance of technologies at the local level. Moreover, it is linked to identification processes in rural areas and can be interpreted as an expression of enhanced participation in decision-making on this vital infrastructure (MacArthur 2013).

### *Overview of energy cooperatives*

Definition: "A cooperative is an autonomous association of persons united voluntarily to meet their common economic, social, and cultural needs and aspirations through a jointly owned and democratically-controlled enterprise". This means that a cooperative is a form of business ownership run by and for their members. The core values are the principles of self-help, self-responsibility, democracy, equality, equity and solidarity (International Cooperative Alliance 2017).

Organisational structure: The cooperative has a lean and functional organisational structure, consisting of a General Assembly, Executive Board and Supervisory Board.



*Organisational structure of a cooperative*

Cooperatives that are established for the purpose of producing and distributing energy, mostly from renewable resources such as wind, solar power or biomass, are called energy cooperatives and offer a suitable model to plan, finance and implement renewable energy projects. The formation of e-coops allows a de-monopolization and democratization of expert knowledge and the entrance of new actors – women, men, youth, etc. – into the energy sector and also demonstrates a decentralized alternative to the existing fossil and wood energy industry. Becoming energy "prosumers" – meaning simultaneously producers and consumers – in a local context is a political process of learning and development with as broad and diverse representation as possible from all parts of society. The increased knowledge and experience

of renewable energy raises its acceptance with the broader public, which is important for the transformational process to move towards a decarbonized and just economy and society.

Cooperatives in the context of (post) socialist experience: Especially in Eastern Europe, cooperatives are a known concept, but this model is linked with 'old-fashioned' and 'socialist' images. Social and cooperative structures are fragile and embossed by a profound distrust towards authorities in former USSR countries. People have little experience with setting up and managing organizations that are economically successful and at the same time democratic and cooperative. Structures and project opportunities for citizen's participation and political involvement are missing. However, cooperatives can act as vehicles for broad democratization and empowerment, instilling basic democratic values and methods, fostering self-reliance through collective action and shaping relationships between institutions and civil society that encourage participation and conflict management. The resulting framework is the foundation for a more secure society and sustainable economic growth. Successful cooperatives promote democratic-based values that entail democratic member control (one member, one vote), participatory management practices, transparency in decision-making and financial accountability, devolution of power, as well as collective action and bargaining power.

### *Situation analysis per country – summary*

For each of the eight countries that are examined – Georgia, Armenia, Ukraine, Moldova, Belarus, Croatia, Serbia and Bosnia and Herzegovina (BiH) – national climate and energy policies, the degree of gender equality, situation of civil society, legal framework for cooperatives and existing pilots, viable business models and suitable RE technologies are analysed. In the following, the most important results for each country are presented by category.

### National climate and energy policies

<b>Georgia</b>	Reduction of GHG according to NDC: 15% below BAU by 2030; RE emphasised to meet energy demand with domestic resources (lack of fossil sources); Liberalisation of energy market, Renewable Energy Act and National Renewable Action Plan in progress.
<b>Armenia</b>	Reduction of GHG according to NDC: Ecosystem neutral in 2050; Improving energy security by developing indigenous energy sources, with a key focus on RE and energy efficiency; FiT scheme for RE in place
<b>Ukraine</b>	Reduction of GHG according to NDC: Not to exceed 60% of 1990 emissions level in 2030; NREAP from 2014 sets targets for the use of RE (11% RE in primary energy supply by 2020); Support mechanisms for RE: Land tax reduction and other tax exemptions, 'Green Tariff' rates for electricity.
<b>Moldova</b>	Reduction of 64 – 67% of GHG emissions by 2030 compared to 1990 levels according to NDC; Improving energy security, integration in regional markets and increasing compliance with EU energy market; FiT scheme for RE installations > 10 kW in place, tendering starting in 2017.
<b>Belarus</b>	Reduction of GHG by at least 28% of 1990 levels by 2030 according to NDC; National support policies for RE include targets for the share of RE of the final energy consumption, regulatory policies and fiscal incentives; FiT available for RE combined with an electric utility quota obligation or renewable portfolio standards.
<b>Croatia</b>	At least 40% domestic reduction in GHG emission by 2030. The target is in line with the EU objective in the context of necessary reductions according to the IPCC by developed countries as a group, to reduce its emissions by 80-95% by 2050 compared to 1990. National low-carbon strategy developed in 2017. Support schemes include: FiP, FiT and net metering.
<b>Serbia</b>	Reduce GHG emissions by 9.8% below 1990 level by 2030. Plans to finalize its climate change strategy and action plan in 2018. Serbia's national renewables target for 2020 is set at 27% of gross final consumption of energy. FiT in place, net metering yet to be defined.
<b>BiH</b>	Reduction of GHG compared to the BAU scenario is 2% by 2030, which would mean 18% higher emissions compared to the base year 1990. According to the BAU, expected emissions in 2030 are 20% higher than the level of emissions in 1990. Developing functional electricity market. FiT in BiH/FBiH, and combination of FiT and FiP in BiH/RS. Net metering introduced in BiH/RS in 2013.

All countries ratified the Paris Agreement and set targets for greenhouse gas (GHG) emission reduction and renewable energy. The targets are varying significantly. Energy communities could assist in meeting the important objectives of the UN agreement.



Degree of gender equality

<b>Georgia</b>	Art. 14 of the constitution provides for gender equality; Georgia ratified CEDAW and OP; Women have equal inheritance rights; Gender Equality and Non-discrimination Law are in place; Gender mainstreaming in policies is included formally, often not in practice; Gender budgeting is not at all common.
<b>Armenia</b>	Art. 14.1 of the constitution provides for gender equality; Armenia joined CEDAW and the OP; Women have equal inheritance rights; National quotas of 20% are in place for women's political participation; no quotas at sub-national levels (except 20% quota for Yerevan City Council); Very little information on gender was found with online and literature research, shows that gender is underrepresented in general.
<b>Ukraine</b>	Constitution provides for gender equality; Ukraine ratified CEDAW and OP, signed onto the Beijing Declaration and Platform for Action, and signed, but not ratified, the Istanbul Convention; Ukraine is still in the process of fulfilling its National Action Plan on Equal Rights and Opportunities of Women and Men for 2013-2016; Gender budgeting is used in pilot projects.
<b>Moldova</b>	Constitution provides for gender equality; Moldova ratified the CEDAW and OP, and signed, but not ratified, the Istanbul Convention; NAP for gender sensitive policy frameworks is being developed in cooperation with UNDP; At a ministerial level, no gender action plans exist and the existing national strategy on gender equality has not been enacted due to lack of resources; Gender budgeting is increasingly used.
<b>Belarus</b>	Although Article 22 of the Constitution states "All shall be equal before the law and entitled without discrimination to equal protection of their rights and legitimate interests," it doesn't mention gender discrimination; There is a national strategy and action plan, however its effectiveness is doubted by various sources; Belarus ratified CEDAW and OP; Gender budgeting isn't currently used.
<b>Croatia</b>	Art. 3 of the constitution provides for gender equality; CEDAW treaty ratified in 1992, and Istanbul Convention is in process of ratification. Labour Law is gender-sensitive, heavily supported by the Gender Equality Act. Committee for Gender Equality in the Croatian Parliament was established for gender-mainstreaming. Gender budgeting approach is rarely implemented.
<b>Serbia</b>	Constitution provides for gender equality; CEDAW treaty ratified. Gender equality mechanisms (GEMs) exist to ensure local implementation of the Law on Gender Equality. Laws regulating marriage and inheritance are not gender sensitive. Gender mainstreaming included in National Strategy on Gender Equality (2016-2020). Gender budgeting is used in pilot projects.
<b>BiH</b>	Constitution provides for gender equality. Gender Action Plan is the most important strategic document for integration of gender equality. CEDAW ratified in 1993. Women often surrender their inheritance rights in favour of male relatives, as is customary practice. Gender mainstreaming in policies is included formally, but not in practice. Gender budgeting isn't commonly used in practice.

In most of the countries the Constitution provides for gender equality. Gender mainstreaming is included in some countries in National Strategy on Gender Equality. Gender budgeting is used in pilots just in Ukraine, Moldova and Serbia. The countries face challenges similar when it comes addressing gender equality. Existing instruments are often not in practice. Women aren't involved in decision processes, neither public, private nor business sector. It seems glass ceilings exist. Gender-sensitive e-coops applying gender-budgeting, gender mainstreaming and providing access to resources for women (time, finance, qualification) can showcase that women's empowerment and knowledge and collective actions are central to building more environmentally sustainable pathways.

Situation and power of civil society

In all former Soviet states that are not members of the EU, societies face pressure from both sides to pivot east or west. For example, in the EEI's socio-cultural dimension that measures social cohesion and trust, post-Soviet States are amongst the worst performing. In post-communist countries, trust (including trust in non-profits) is low and may not have been helped by the post-communist influx of non-indigenous forms of civil society. Georgia has a socio-cultural score of 0.46, below the global average of 0.52. Besides the socio-cultural dimension, there is strong correlation between socio-economic development and the enabling environment for civil society. The only sub-average countries in Europe in socio-cultural respect are Macedonia, Montenegro, Georgia and Kosovo, whose low results can be attributed to a failure to tackle gender inequality (CIVICUS 2013, 2016).



<b>Georgia</b>	CSOs are participating in policy processes; After the Rose Revolution in 2003 and elections in 2007, progress and influence of civil society has weakened and lately improved; Orthodox church is very influential.
<b>Armenia</b>	CSOs are proceeding both on national and local levels; Growing participation and collaboration with government; Corruption and increasing electricity prices have been the key drivers for protest.
<b>Ukraine</b>	Civil society played a leading role during the Euromaidan Revolution started in 2013, pushing parliament and government to advance reforms; It continues to be one of the strongest actors in Ukraine's democratic transition; Ongoing economic crisis limits public and private sector funding to CSOs.
<b>Moldova</b>	Relations between government and civil society are characterised by protest but have improved lately. Political party 'Dignity and Truth' evolved 2015 out of pro-European and anti-corruption protest movement.
<b>Belarus</b>	Despite fairly good socio-economic conditions for civil society, Belarus has poor governance contexts, which are marked by fierce state-civil society relations.
<b>Croatia</b>	CSOs participate in policy processes with long tradition, but overall civic participation is below the EU average. Church is very influential, sex education is a divisive issue. Croatian associations are small and rely on volunteer work. Official definition of social enterprise, introduced within Strategy for Social Entrepreneurship Development, adopted in 2015.
<b>Serbia</b>	No binding document for obligatory CSOs inclusion in policy-making process. National Strategy on Enabling Environment for CSO Development not yet developed. The freedoms of are constitutionally guaranteed and the government generally respects these rights. Social entrepreneurship currently appears in the form of individual initiatives, working on unemployment and social exclusion.
<b>BiH</b>	Year 2016 was marked by crucial political developments – census data published, elections, referendum in RS, BiH application for accession to the EU accepted. Still no functional mechanism for state-CSO cooperation. Reducing poverty and social exclusion based on passive support. Civil rights are codified by law, but are not always properly respected and protected. System of support currently under development.

### Legal framework for cooperatives

All target countries recognize the legal form of cooperatives which formally allows their establishment, yet energy cooperatives remain uncommon. Lack of knowledge and missing support are main barriers.

<b>Georgia</b>	Legal provisions exist for "agricultural cooperative" and "consumer cooperative"; E-coop can be established according to existing provisions, following Entrepreneur law.
<b>Armenia</b>	The Law on the consumer cooperative gives relevant legal provisions in connection with the Civil Legislation; E-coops can be categorized as production and consumer coops and are legally possible, but not yet common.
<b>Ukraine</b>	The Law on Co-operation from 2003 gives relevant legal provisions; There is no special law on energy coops.
<b>Moldova</b>	Legal provisions allow establishing cooperatives in various sectors, including energy, and lie within the Civil Code of Moldova, the Law on entrepreneurial cooperatives and the Law on production cooperatives.
<b>Belarus</b>	Legal provisions for cooperatives in place; however, no information on situation of e-coops could be found.
<b>Croatia</b>	Legal provisions allow establishing cooperatives of various types, but this sector is still very small and underdeveloped. Agricultural cooperatives are most common, and energy cooperatives can be established. The Croatian Low Carbon Development Strategy (2017) encourages citizen participation in RE through cooperatives and similar innovative platforms.
<b>Serbia</b>	New Law on Cooperatives adopted in 2015. The Law does not recognize e-coops, but it does not show any legal obstacle to their formation. Currently, some development attempts are underway. Agricultural cooperatives are common. Legislation on cooperatives is sufficiently wide to include energy initiatives.
<b>BiH</b>	At BiH state level is a General Law on cooperatives. Key barriers for development of energy cooperatives are insufficient political support and possible resistance from the public.

### Existing pilots, business models and technologies

There are multiple reasons for the upward trend of renewable energy-based community initiatives. Drivers include the multiple economic, social and environmental benefits, increased control over energy generation, keeping investments local, sending a political key message and the overall opportunity for sustainable, just and democratic way of business. In most cases, the rationale for a given project involves a combination of drivers. Today, RE technologies are among the most cost-competitive options for power generation (IRENA 2016). In countries with strong, centralised monopolies, the energy market may not be open to small, bottom-up initiatives. Even in countries with state support for community energy initiatives, it can be an enormous challenge for local communities to access the funding, necessary skills, time and other resources to organise and construct a project.

Continued government support for existing players (including fossil fuels) decreases trust in energy communities' success. For these reasons, community projects are often slow to come to fruition or may even fail during the development process. An enabling environment for community energy involves stable and long-term political support from governments at the local, regional, national and even supranational (e.g. EU) levels, as well as dependable provision of credit and capacity building frameworks. The policy framework plays a crucial role in fostering community renewable energy projects, even more so than overcoming technical barriers, and regions that have supportive policies have seen a proliferation of community energy initiatives. Some of the examined countries show more development of community energy initiatives than others and demonstrate the feasibility and will of citizens, energy communities and local and national governments.

<b>Georgia</b>	Four e-coops with a business model based on Solar Water Heaters; Foundation of a gender-sensitive umbrella cooperative in October 2017.
<b>Armenia</b>	Currently no active energy cooperatives; First energy cooperative is planned in the municipality Basen in November 2017 to run a PV power plant with strong support of municipality.
<b>Ukraine</b>	A number of community energy initiatives exist in Ukraine; E-coops such as the 'Ternopil raspberry energy cooperative' emerge out of agricultural cooperatives; Also developments for 'PV-coops' with business models based on Green Tariff with support and expertise of strong CSOs.
<b>Moldova</b>	Currently, no citizen's energy project. E-coops are legally possible, but establishment is complex and the model is not known very well; Good experience and expertise with Solar Water Heater and Solar PV, which is economically viable with the Green Tariff.
<b>Belarus</b>	No pilots could be found.
<b>Croatia</b>	First Croatian energy cooperatives were set up within the UNDP project in 2013, and 9 coops are currently active. Some community energy models have already been implemented, but there are no state incentives and energy coops meet many legal barriers. Green Energy Coop, Island of Krk Coop, Energy Coop Kaštela and War Veterans Coop Kapela have already implemented some RE and EE initiatives.
<b>Serbia</b>	No energy coops in Serbia at the moment, but there are some developing attempts underway. There is a small hydro powerplant in Donja Bistrica bought and restored by the municipality in 2016.
<b>BiH</b>	No energy coops in BiH at the moment. REIC is currently developing the first 2 energy coops in Prijedor and Nemili in 2017.

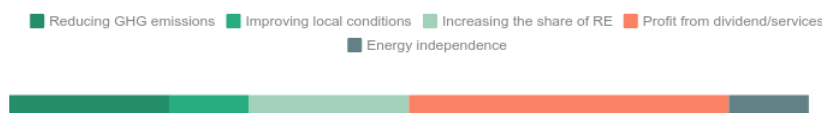
### *Prospects and conclusions*

In all countries – except Belarus – initiatives have already started small-scale decentralized renewable energy projects with public participation. While still struggling with strong monopolistic structures, lack of funding and experience in the model, they are able to show reasonable and successful energy solutions. Strong CSOs seem to be the main initiators for energy cooperatives. Overall, cooperatives can be established as a tool to boost safe, affordable and decentralised energy production. Capacity building, empowerment and trainings are key cooperative principles, as they are linked to joint ownership and democratic control. The community-based approach also increases the involvement of women. Departing from an active and locally based bottom-up dynamic, cooperatives are characterised by a strong link between the enterprise on one hand, and the territory, women and men working and benefiting from the cooperative on the other, thus forming a generation of trust. There is a link between decentralized renewable energy production and rural development in terms of women and men's economic empowerment, jobs creation and infrastructure development. RE in energy coops can create valuable and decent jobs for people in regions with few employment opportunities, although the number of direct jobs created is limited. Most of the jobs are in operating and maintaining installations. However, the largest share of long-term jobs is not in direct energy generation, but along the RE supply chain – in consulting, financing, construction, specialised services and within rural activities such as farming, dairy products or other food production where women are highly represented. Production chains of agricultural products can use RE to improve the value chain and the products. Many women and men can increase the quality of their products as well as their profit margin. Energy cooperatives reduce “fuel poverty” that can be a common feature of remote regions

and disproportionately affects women, as they are responsible for feedstock, nutrition and household. Organising energy coops allows remote communities to bundle experience, capital and land to produce their own energy. Women could play an important role and reduce cost and time spent on other energy sources. Overall, cooperatives can have an increasingly positive impact on women's economic and social empowerment while incorporating instruments like gender budgeting, quota, leadership training, etc.



### Motivation to start an energy cooperative



The stakeholder survey in eight countries shows that a high percentage of people know the concept of energy cooperatives. 21 of 25 interviewed persons know of e-coops. The motivation to set up them is manifold and reflects climate protection, improving living conditions, increasing renewable energy, profit from dividend/services and increasing energy security. The most important motivating factors as a member of the cooperative are receipt of profit from dividends and benefits like renewable energy tariffs and energy efficiency services. Despite political targets for energy transition in the countries

surveyed, the respondents explain there is an overall lack of political commitment and serious will to foster renewable energy and energy efficiency. There is also high agreement that energy cooperatives can increase gender equality and women's empowerment, but only 10 of 25 respondents see that women are disproportionately affected by energy issues. We see a high acceptance of 24 respondents who believe energy cooperatives are able to reduce GHG emission with public participation.

The matrix assesses the overall situation of the countries with a rating system from 1 (poor) to 5 (excellent). The assessment is based on the countries' situation within each of the sectors.

Rating system	1 = poor	2 = fair	3 = average	4 = good	5 = excellent	
Country	Climate+Energy	Coop. Law	CSO	Gender	Pilots	Assessment
Georgia	3	3	3	3	4	16
Armenia	4	3	3	2	2	14
Ukraine	3	4	4	4	4	19
Moldova	4	3	3	2	2	14
Belarus	2	1	2	1	1	7
Croatia	4	4	4	4	5	21
Serbia	4	3	4	2	4	17
BiH	4	2	3	2	2	13

Using this methodology, we see good conditions for energy cooperatives in Croatia, Ukraine, Serbia and Georgia. Possible (not necessarily perfect and favorable) legal framework, strong CSO actors and pilots can be good entry points for further energy cooperative development with the multiple benefits described above. As sustainable enterprises, e-coops can work for the sustainable development of their local communities through policies approved by their members. Despite the fact that sustainable development and the cooperative movement were born out of different motivations, they address – although to different degrees and at different levels – a common ground: to reconcile economic, social and environmental needs, whether the needs of a local community or the needs of the whole world. Accordingly, cooperatives are ideally placed to promote sustainable development and foster a “Green Economy” –adopted by Rio+20 as a practical concept and vehicle for achieving sustainability.

Deployment and development of RE projects are supported by inclusive governance, even if the RE policy is mostly top-down. The key to success are intermediate institutions, like energy cooperatives and local governments. Energy cooperatives therefore encourage people to take a longer-term view by creating common expectations towards a 100% RE policy that goes beyond individual interests. They disseminate clear and reliable information to the local community. E-coops operate between national/regional governments and individuals/firms and can play an important role in solving market failures and promoting collective action. Cooperatives can adapt national policy interventions to the characteristics of a local community. Energy access is a vital catalyst for wider social and economic development by reducing energy poverty, enabling education, health and sustainable agriculture, improving infrastructure and creating jobs.

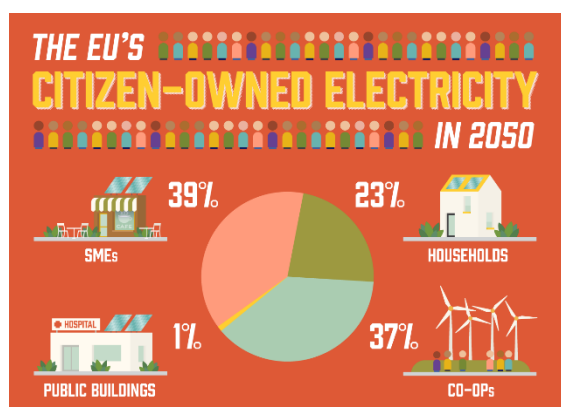
The legal framework of cooperatives – embedded in energy and climate goals, gender acts and the role of civil society – is known in all target countries. The characteristics of coops have remarkable potential to meet national climate goals, increase gender equality and foster a safe and affordable energy supply. Two scenarios show data for the number of energy coops, investments and created jobs in the countries, with consideration for very slow, difficult development as well as successful progress.

Scenarios for economic impact of e-coops in the target countries

	Estimated invest with exist. pilots		Worst case scenario 5 years			Best practice scenario 5 years		
Country	Exist. Pilots	Investm. In €	No. Coops	Invest	Jobs	No. Coops	Invest	Jobs
Georgia	SWH, PV	100.000	2	200.000	2	15	1.500.000	30
Armenia	PV	200.000	2	400.000	2	15	3.000.000	30
Ukraine	Biomass, PV	200.000	3	600.000	3	20	4.000.000	40
Moldova	SWH	100.000	2	200.000	2	15	1.500.000	30
Belarus						5	500.000	10
Croatia	PV, Biomass	250.000	3	750.000	3	20	5.000.000	40
Serbia	PV, Biomass	250.000	3	750.000	3	20	5.000.000	40
BiH	PV, Biomass	150.000	2	300.000	2	15	2.250.000	30
<b>Total</b>		<b>1.250.000</b>	<b>17</b>	<b>3.200.000</b>	<b>17</b>	<b>125</b>	<b>22.750.000</b>	<b>250</b>

The scenarios consider the existing pilot projects and estimated investments. Based on the output of the surveys on knowledge and assessment of energy cooperatives, the concept could be established and upscaled in nearly all assessed countries. The worst case assumes a very slow and difficult development in creating one job per established cooperative, which could be within the coop but also an indirect job. The best estimate sees an improvement in the overall conditions and efficient use of stakeholder potential. The job creation here is still conservative, with two jobs per founded initiative.

Additionally, the report “Putting citizens at the heart of the energy transition” (REScoop 2016) estimates the number of energy citizens that exist today and that could exist in 2030 and 2050 in member states and the EU as a whole, if the right conditions are in place. It shows that over 264 million European citizens, or half of all citizens in the European Union, could produce their own energy in 2050. These energy citizens could produce 611 terawatt-hours (TWh) of electricity in 2030 and 1,557 TWh by 2050. This means that in 2030, energy citizens could deliver 19% of Europe's electricity demand and 45% in 2050. This is a significant contribution to achieving the EU's 2030 renewable energy target and moving towards a 100% renewable future. The report also shows the potential of different types of energy citizens. In 2050, collective projects such as cooperatives could contribute 37% of the electricity produced by energy citizens.



REScoop 2016

Even so, there is still not enough knowledge to understand to what extent this organisational form is able to unify a growing group of actors in promoting a renewable energy system (societal power) and to gather capital for elaborating renewable energy supply structures (economic power). This easy calculation and the REScoop study demonstrate that the inclusive and cooperative approach is able to mobilize public participation, democratic principles and private capital and shows the potential for wider energy system transformation, investments and jobs creation. In cooperation with governments,

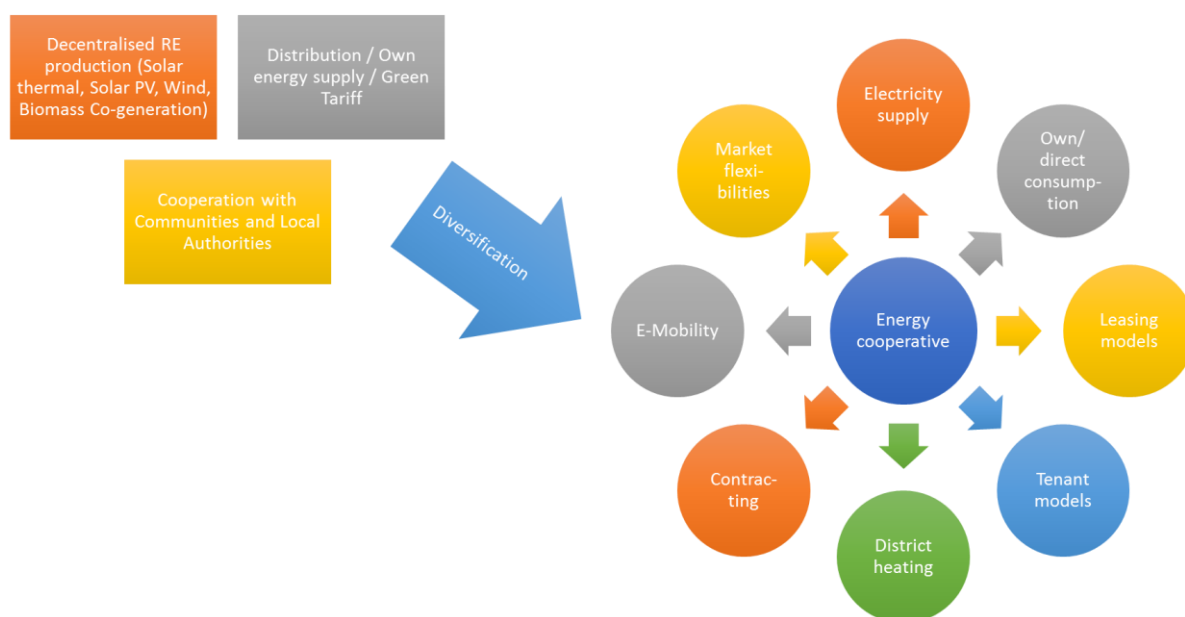
they can build a fair and gender-just climate policy and even contribute to low-carbon energy supply in the European context.

### *Recommendations and outlook*

This analysis is meant to show the potential of energy cooperatives for transformation towards a socially, environmentally and economically sustainable low carbon energy supply, and is addressed to both decision-makers and those who are or want to engage in citizen's energy initiatives to become change agents. This last section provides recommendations from a practical and political perspective.

### Activities within the energy value chain

Today, the biggest possible area of activity is energy production, using solar thermal, biomass related, solar photovoltaic (PV) or co-generation RE technologies. The energy distribution sector is complemented by consumption through members and green tariffs for electricity. Energy efficiency in buildings and the installation of insulation measures can be a business model on their own. Both the increase in energy efficiency and the production and distribution of RE lead to cost savings and environmental benefits. As a crosscutting issue, the close cooperation with communities and local authorities is a factor for success. To stay competitive, those business models need to be diversified. Within RE, this development is characterised through two major factors. First, renewables are becoming increasingly cheaper over time. Second, there is huge potential for the development of decentralised RE solutions (George und Berg 2011).



Business models today and in the future, Source: WECF

For **electricity supply from renewable resources**, different models can be realised, such as own or direct consumption, leasing models and tenant models. **District heating** is an area in which Western European coops are already active, but hold further future potential (Energieagentur Rheinland-Pfalz GmbH 2015; DGRV Bundesgeschäftsstelle Energiegenossenschaften 2015a). At the moment, limitations on the profitability of such projects are only posed by low prices for fossil oil and gas, which are direct competitors of renewable heating solutions (Ernst 2016). The leading development will be the so-called **sector-integrated energy market**. This means the production of RE has to be interconnected with the heating of buildings, energy efficiency and mobility. In all three of those areas, huge savings potential can be found. With their local structures, energy cooperatives can make a crucial contribution to this integration (DGRV Bundesgeschäftsstelle Energiegenossenschaften 2015b).

A first step in this direction is to offer flexibilities for the electricity market, smoothing fluctuations caused by altering supply and demand. Technologically, this can be realised through storage of heat or electricity, power cogeneration and combined heat/electricity supply products adapted to a local context, e.g. using PV and combined heat and power. A medium to long-term solution is the operation of power-to-heat plants. For example, the excess electricity produced by (cooperatively-owned) wind power plants can be turned into heat and then marketed. Against the background of sinking costs for storage technologies like batteries, using energy storage, such as embedding it into a virtual power plant as part of a business model, can increase profitability (DGRV Bundesgeschäftsstelle Energiegenossenschaften 2015b; Energieagentur Rheinland-Pfalz GmbH 2015).

The **trend towards digitalisation** enables actors in the energy market to develop new business models that partly cover much more than the traditional activities of energy service providers. Digitalisation influences the way we communicate and use technical devices, as well as most of our professional activities and processes. The evolution of digitalisation is characterised through an increasing availability and use of information in all areas of life while decreasing marginal cost. Data exchange has transformed from unidirectional to multidirectional information flows between users, operators, providers and producers of technical solutions. Digitalisation must not be seen as a standalone business model or isolated from other developments. In the energy sector, this can be evident in the optimisation and automatization of processes and core tasks like service and customer relations. For example, new products and business models based on the analysis of consumer data can be useful for energy efficiency and energy saving (Schneider et al. 2017).

#### Recommendations for national, EU and international authorities

To meet climate goals, Europe's energy market needs a fundamental transition from a system based on fossil fuels and nuclear power towards one based entirely on renewable energy. It is transforming from a centralised market dominated by large utilities, to a decentralised market with millions of active and informed energy citizens. Without energy citizens, the energy transition is not possible. Empowering energy citizens to produce their own energy is about democratising the energy system. However, energy citizens both overall and in the analysed countries still face significant obstacles including legal restrictions, disproportionate administrative and planning procedures, punitive tariffs and missing strong political will towards RE. With an enabling legal framework and strong backing, energy citizens could flourish, deliver a significant share of Europe's renewable energy and provide important flexibility to the energy system through demand response (REScoop 2016).

The most important recommendations are:

#### EU Level:

- Strengthen the right to self-produce, self-consume, receive fair payment for excess electricity fed into the grid, store energy and engage in demand-side management.
- Guarantee priority grid connection for energy citizen projects.
- Simplify administrative procedures, such as the creation of energy communities.
- Encourage innovative financing solutions, including third-party financing for energy community projects.
- Provide opportunities for low-income communities to become energy citizens through obliging member states to design targeted measures.
- Ensure that the true benefits of energy citizens are communicated transparently and included in impact assessments.
- Set targets for energy citizens in their 2030 national renewable energy action plans.



- Encourage member states to retire from polluting and inflexible coal and nuclear plants to make room for energy citizens in the market.
- Include gender-mainstreaming and gender-budgeting for energy projects and targets.
- Foster an enabling environment for civil society to improve the socio-cultural and socio-economic environment.
- Clear targets to meet the SDGs on the European level, linked with energy and climate goals.

National Level:

- Adopt a national strategy to increase the participation of citizens in RE projects.
- Establish binding targets for renewable energy and, more specifically, targets for community energy.
- Incentivise community energy projects based on 'self-sufficiency' (e.g. direct marketing and production for self-consumption).
- Provide financial support (e.g. grant-to-loan, guarantee or cheap credit opportunities) for preliminary investigations and works on community energy projects.
- Local governments, with support from national governments where appropriate, should use planning powers to require integration of RE and energy efficiency into public, new and renovated buildings and streamline requirements for community power projects.
- Provide equitable grid access for community power projects.

The energy transition is happening. The global climate policy and energy transition in various countries show similar discussions in Europe and around the globe: How to save energy and to use energy more efficiently? How to achieve liberalization of energy supply with former monopoly actors with state ownership to enable innovation and fair competition? How can (supra-)national governments support the energy transition, which climate instruments, laws, grant programs and feed-in-tariffs could boost this process? How to share the necessary investments in a fair way and how to mitigate the fierce struggle for resources, market shares and profits? Which participants will shape the energy transition in the future? Which decisions do we have to take today in terms of common welfare and future generation?

The question how to implement the energy transition in a socially fair and democratic way is often ignored. Energy community and energy cooperatives are initiatives showing the potential a socially fair and democratic energy transition with clean energy. They are already able to change energy systems and their impact can be increased for a social and democratic energy supply.

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