Feasibility study of gender-sensitive energy cooperatives in Georgia, Ukraine, Armenia and Moldova

December 2016

Summary

This in an overview of the feasibility of gender-sensitive energy cooperatives in Georgia, Ukraine, Armenia and Moldova. In each country, existing national climate and energy policies are examined and, if existing, feed-in tariffs for renewable energy are explained. Further, the energy supply and gender aspects are explored, with a focus on rural communities. The country-specific legal framework for (energy) cooperatives is summed up, followed by an overview of existing cooperatives in the countries. Overall, there is huge potential in the four countries to improve energy supply of households, economic empowerment and to make a contribution to climate protection using the model of an energy cooperative. Legal, technological, social and financial factors are considered.

Cooperatives for renewable energies can introduce new forms of socioeconomic organizations in the energy sector (production, distribution and trade) in which citizens are involved in all areas of municipal management and the design of energy resources. This type of self-management of energy sources and systems can have positive social and environmental impacts. Energy cooperatives offer proven advantages in many cases and are both economically viable and robust against macroeconomic instabilities. Not only affecting the energy situation, they contribute to the equal participation of women and men in decision-making processes on a local level. Cross-national knowledge transfer and experience exchange is crucial to establish and support the development of energy cooperatives successfully.

Financially supported by

AMOHR · EWS · Fondation RAJA Danièle Marcovici Agir pour les femmes · Auswärtiges Amt · URBIS FOUNDATION · GLS Treuhand Stiftung Neue Energie

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BAU	Business as usual scenario
EE	Energy Efficiency
FES	Fuel Efficient Stoves
GHG	Greenhouse Gas
INDCs	(Intended) Nationally Determined Contributions
RE	Renewable Energy
SDGs	Sustainable Development Goals
SWH	Solar Water Heaters
TI	Thermal Insulation
TPP	Thermal Power Plant
WECF	Women in Europe for a Common Future e.V.

1. Introduction

After the coming into force of the Paris Agreement on 4 November 2016, the Agenda 2030 and the 17 Sustainable Development Goals (SDGs) are relevant like never before. Public participation and gender equality play a significant role for the implementation, which was underlined by the decision on the continuation of the Lima-Work-Programme that was made during the 22nd conference of the parties (COP22) in November 2016. The fulfilment of global and national obligations requires appropriate instruments.

The principles of cooperatives are self-help, equality and equity, voluntary and open membership as well as democratic governance and ownership. For the realization of a civil-society-driven energy transition, promoting gender equality and, at the same time, meeting country-specific climate protection goals, namely the Nationally Determined Contributions (NDCs), energy cooperatives represent a unique opportunity. Especially in former USSR countries as Georgia, Ukraine, Armenia and Moldova, they have the potential to reduce poverty, to create jobs and to boost social development and reach therefore multiple benefits. Considering existing gender-related inequalities in those countries that are also linked to energy issues in many cases, they empower women to take actions to change their situation, and to get involved in local decision-making processes. Energy cooperatives provide the opportunity for an inclusive and sustainable way to combat climate change.

To evaluate the existing structures and their degree of readiness for a comprehensive development and expansion of energy cooperatives, Women in Europe for a Common Future e.V. (WECF) carried out a feasibility study with local partners[1] for the four project countries. This publication gives an overview of the current situation in the countries as a basis for further inspections.

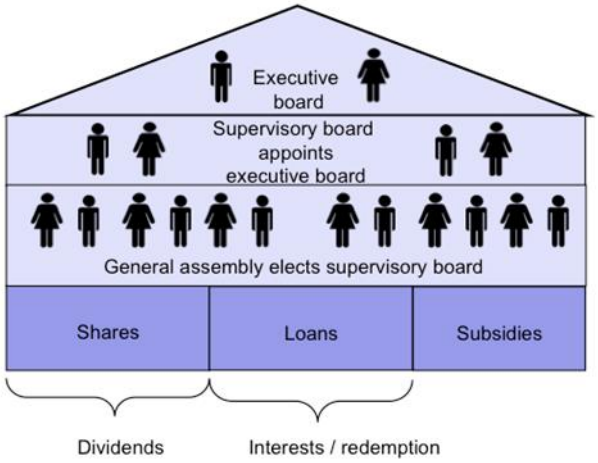

Figure 1: Bodies of a cooperative

[1] Ecoclub (Ukraine), Gutta-Club (Moldova), RCDA (Georgia) and Tapan (Armenia)

2. Current situation in Georgia

WECF is implementing cooperative projects in Georgia since 2015. Following a row of workshops for local initiators of coops with input from local experts, e.g. from agricultural and credit cooperatives and the presentation of experience with energy cooperatives in Western Europe, four regional energy cooperatives in Khobi, Akhaltsikhe, Chardakhi and Khoni have been established. The establishment of an umbrella cooperative is in progress.

2.1. National climate and energy policies

On 8 May 2017, Georgia has approved the Paris Agreement (UNFCCC 2017a) with the same legal effects as acratification. Therefore it can be expected that Georgia will transmit it NDCs as part of the Paris Agreement soon. In the framework of Georgia's in the framework of former decision of the Conference of the Parties (COP), the country has already transmitted its INDCs (Intended National Determined Contributions) and commits itself to unconditionally reduce its greenhouse gas emissions (GHG) by 15% below the Business as usual scenario (BAU) and by 25% subject to a global agreement, addressing the importance of technical cooperation, access to low-cost financial resources and technology transfer for the year 2030 (Ministry of Environment and Natural Resources Protection of Georgia 2015).

In 2006, the resolution "Main directions of state policy in energy sector of Georgia" was passed, including goals as the development of a tariff policy, meeting the local energy demand and the long-term goal of covering the whole amount of the national energy demand by national resources, which emphasized renewable energies due to a lack of natural gas and oil reserves in Georgia. It is also explicitly pointed out that the expansion of renewable energies should take place in a competitive environment, where conventional renewable energy sources are being developed and alternative energy sources. Thus, funding models such as feed-in tariffs, acceptance guarantees, etc. are practically excluded.

In 2008, the government programme "Renewable Energy 2008", which focuses on the liberalization of the energy market, which is planned to be completed between 2017 and 2020, was published. In addition, a Renewable Energy Act as well as a National Renewable Action Plan, are in prospect. For the Renewable Energy Act, a draft exists already. In addition, the prioritized access to energy produced from renewables to the power grid is in planning. Due to the natural conditions of the country, a clear focus of the efforts on wind energy can be observed (Deutsche Wirtschaftsvereinigung 2014; Sumbadze 2014; BMWi 2015).

The tariffs for the supply of gas and electricity are set by the Georgian National Energy Regulatory Commission (GNERC), which is strongly influenced by the government that seeks to control the entire energy sector (Transparency International Georgia 2008).

2.2. Feed-in tariffs

Georgia practices a liberal energy market regulation in which renewable energies compete with conventional fossil fuels and get barely state support. Feed-in tariffs for electricity and a purchase guarantee for electricity from renewable energies do not exist.

There is no prioritized network access for renewable energy installations, but in principle, a connection to the electricity network is guaranteed for third parties. A Renewable Energy Sources Act was originally expected for 2016. But anyhow, according to local experts, it will most likely not include a substantial expansion of the promotion mechanisms (BMWi 2015).

2.3. Situation in rural communities

WECF's activities in Georgia focus on rural areas in the 7 target regions Imereti, Kakheti, Mtskheta-Mtianeti, Samtse-Javakheti, Samegrelo, Ajara and Guria.

2.3.1. Energy supply

The approximate number of sunny days in most regions of Georgia is 250 – 280 per year, which is equal to 6.000 – 6.780 hours of sunshine, whereby Eastern Georgia is sunnier than Western Georgia. The annual radiation of the sun varies between 1.250 and 1.800 kWh/m^2, while the average sun radiation equals 4.2 kWh/m^2. The total annual solar energy potential is around 108 kWh. The wind energy potential is estimated to be able to generate 4 billion kWh p.a. Georgian geothermal water reserves reach 250 mln m^3 p.a. (Ministry of Energy of Georgia 2013).

Three companies carry out distribution of electricity in Georgia: "Telasi", supplying Tbilisi and its surrounding area, "Kakheti Energy Distribution" supplying Kahketi region, and "Energo-Pro Georgia", supplying the other territory of the country.

Prices for electricity and gas in are high and have an increasing tendency. For this reason, Georgia's rural households spend on average 30% of their income on energy, resulting in widespread energy poverty. For heating and cooking, firewood from mostly unsustainably managed forests is being used in an inefficient way, requiring much time to be spent on the collection. In the present target areas of WECF, 1.4 million people suffer from energy poverty, a lack of information and access to renewable energies. Rural households are not able to finance RE and EE technologies without appropriate financial mechanisms.

2.3.2. Gender aspects

Women still have a low social and economic status in Georgia and are disproportionately affected by negative, energy-related effects. Traditionally carrying out housekeeping activities, they often suffer from indoor air pollution caused by the combustion of wet wood and the use of other biomass plastics to fire up the poorly ventilated stoves, leading amongst others to respiratory diseases. The time-consuming and physically draining collection of firewood contributes to poor health conditions and leaves little time for activities on education or generating additional income. These circumstances prevent women from economic and political interactions and from actively changing their situation. Compared to more urbanized regions, women are up to four times more likely to sink into poverty in some rural areas as in WECF's project regions Kakheti and Mtskheta-Mtianeti, according to International Fund for Agricultural Development.

Figure 2: Georgian woman

2.4. Cooperatives

Four energy cooperatives have been successfully established and showed the feasibility of this democratic business model. The cooperatives offer their members consulting, service and installation of solar water heaters (SWHs) to start with. Interest and need for these are extremely high. Simultaneously cooperatives and supporting NGOs will work on the development of infrastructures in order to improve the quality of products and increase the production capacity. Women and men are convinced that energy cooperatives have a strong socio-economic role through RE production. The range of technologies so far will be effective in reducing GHG emissions with different projects and can be up-scaled in terms of funding and technology. The renewable energy cooperatives are striving for decentralized, ecological and sustainable energy solutions combined with economic targets. The roles and responsibilities are agreed by all the members – citizens in the local communities – which have an equal say independent of the size of the investment they have made. This strengthens their ownership feeling and provides – contrary to the fossil energy industry – a structural pre-requisite for a gender-responsive approach for energy supply. The gender-sensitive energy coops in Georgia are democratic, gender-equal and gender-responsive aiming to achieve at least 50% of women's participation.

2.4.1. Legal framework

Georgia's legal framework doesn't provide any specifications for energy cooperatives. Provisions for the founding of a cooperative as a legal entity can be found in article 60 of the "Entrepreneurs Law of Georgia".

"Law of Georgia on Agricultural Cooperatives" was introduced in 2013. WECF and its partners checked the legal, social and economic conditions for cooperatives in Georgia resulting that it could be a very interesting alternative for renewable energy production, distribution and energy efficiency in rural areas with high public acceptance and participation.

2.4.2. Existing cooperatives and best practices

So far, four energy cooperatives with an obligatory women's quota of 40% has been established in the framework of WECF's activities in Georgia.

A business model for the production and distribution of solar water heaters (SWH), fuel efficient stoves (FES) and thermal house insulation services (TI) is already in use. The business model builds on pilots, including the EU-funded pilot project "Switch to the Sun – Live in Comfort", in which the foundations of the energy cooperatives were laid through technology development and capacity building and during which 800 SWHs and TI were installed successfully. Within the pilot project "Energy Cooperatives in Georgia" (WECF 2016) the first energy cooperatives started to produce and sell SWHs, FES and TI. Even if they are operating as yet on a smaller scale, they have big potential to increase their production.

In addition, a business plan for an umbrella cooperative for the coordination of production, marketing, the purchase of technologies and for generating economies of scale has been developed.

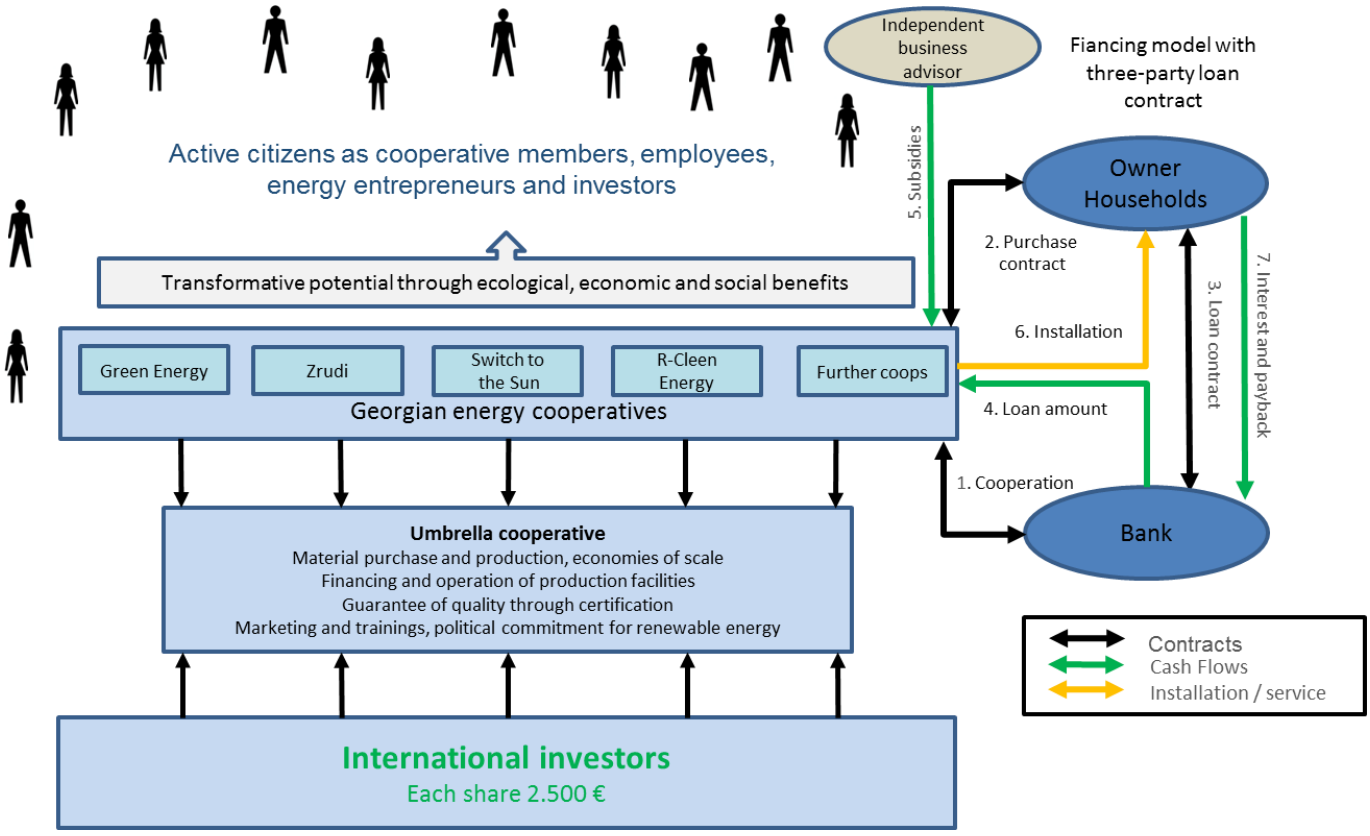

Figure 3: Georgian cooperative and funding model

3. Current situation in Ukraine

3.1. National climate and energy policies

Ukraine has signed the Paris Agreement and ratified on 19 September 2016 (United Nations 2017). In its already transmitted NDCs the country defines to reduce GHG emissions at least by 40% below 1990 levels in 2030. Next steps are the adoption of relevant legislative acts for the INDC implementation. Also the implementation of the Association Agreement between the EU, the European Atomic Energy Community and their Member States and Ukraine, ratified by the Law of Ukraine dated 16.09.2014 No. 1678-VII (UNFCCC 2015).

3.2. Feed-in tariffs

In 2008 the Law of Ukraine "On Amendments to Some Laws of Ukraine on the establishment of Feed-in "tariff", which includes provisions for the mandatory purchase of electricity suppliers (energy market) from the following sources:

- Small hydropower (installed capacity of 10 MW);
- Wind power plants;
- Solar power;
- Power plants that use of biomass as fuel.

"Feed-in" tariff – is an economic mechanism that aims to promote renewable energy power generation.

In Ukraine, the green tariffs that allows to buy energy 10 kw 13.000/$ are not affordable for most of the people.

3.3 Energy cooperatives

3.3.1 Legal framework

In accordance with Articles 1 and 2 of the Law of Ukraine "On Cooperation", cooperatives can be established as a legal entity formed by individuals and/or entities who have voluntarily joined together on the basis of membership to conduct joint economic and other activities to meet their economic, social and other needs on the basis of government.

In the regulatory framework of modern Ukraine there is no concept of "energy cooperative". Legislation concerning cooperation distinguishes only different types of cooperatives in nature:

- production,
- consumer,
- service,

as well as by the direction of activity:

- agriculture,
- housing construction,
- garage,
- garden,
- educational or credit cooperatives and so on.

Their activities are governed by general legislation: the Civil Code, the Commercial Code, Housing, Tax, Customs and Land Codes of Ukraine and the Law "On Cooperation".

With regard to the functioning of consumer and agricultural cooperatives special laws were adopted that created quite a clear legal framework for their operation – the Law "On Consumer Cooperatives" and the Law "On Agricultural Cooperation".

The **consumer cooperative** is a voluntary association of citizens and legal entities on the basis of open membership to meet material and other needs of participants, carried out by the association of property share contributions and distributes profits from business activities equally among all members.

The features of this organization are:

- The members of the consumer cooperative are not obliged to participate in work;
- The members of the cooperative are not liable for the debts of the organization and cover them with contributions;
- The obtained profit from business is shared between the members.

Advantages of such cooperatives:

- Stability of trading, due to the reliability of the participants;
- Distribution of profit among the participants of the cooperative;
- Democratically elected leadership.

Disadvantages of such cooperatives:

- Democratically elected leadership may not have sufficient experience in entrepreneurship;
- Passivity of ordinary members of the cooperative management won’t use the possibilities of the coop model.

Production cooperative is a voluntary association of citizens on the basis of membership for the joint production or other economic activity, based on their personal labour participation and pooling of property shares. The charter and the law may provide for the participation in the activities of the cooperative production on the basis of membership of others.

The main feature of cooperatives is that their activities are directed at profit, which fundamentally differ productive cooperative from the service cooperatives and consumer cooperatives, whose activities are mainly focused on the needs and services to its members.

Advantages of such organization:

- Profit of cooperative is distributed among its members not in proportion to their shares, but according to their contribution to employment;
- With the same method are shared the assets, remaining after the liquidation of the cooperative and the satisfaction of its creditors;
- This procedure for the distribution of material engages each member of a cooperative conscientiously treat their work;
- Legislation is not limited to the number of members of the cooperative, which provides a great opportunity for individuals to join the cooperative;
- Equal rights of all members in the management of the cooperative, since each has only one vote.

Disadvantages of such cooperative:

- The number of members of the cooperative should be at least 5 people, and this severely limits the possibility of creation;
- Each member of the cooperative has limited vicarious liability for the debts of the cooperative.

Service cooperative is a voluntary association of citizens on the basis of membership for providing services to cooperatives and other entities with a view to proceeding to business. Service cooperatives provide services to others in the amount not exceeding 20% of the total turnover of the cooperative.

The peculiarity of this type of cooperative is that its members are combined into one cooperative co-owner of the company and its customers. It has an important catalytic value that promotes orientation interests of cooperative enterprises, primarily in search of economic benefits in group actions.

Agricultural cooperative is a voluntary association of citizens and legal entities on the basis of open membership, which besides other things deals with the processing of livestock and crop production, supply of capital goods to members of the cooperative and the provision of services to meet the economic, social and other needs on the basis of government.

Cooperatives may exercise the right to sell goods and provide services at prices and tariffs established on a contractual basis, separately for cooperative members and others.

The direct economic activity of the energy cooperative can provide:

- Harvesting and processing of residues of agricultural raw materials and energy crops, which is carried out without a license but requires a fund of agricultural land, which is formed by equity contributions of the cooperative, that were leased or purchased property;
- Harvesting and processing of timber that requires a permit for the special use of forest resources;
- Manufacturing and supply of biogas derived from recycled biomass (plant and animal) through the installation of biogas plant that requires a license to supply biogas. Necessity to create or

connect to the gas transmission networks and approval of tariffs by the National Commission for state regulation in the energy and utilities services;

- Production and supply of thermal energy through the construction of heat-generating objects on land power, which requires a license to supply thermal energy necessary to create or connect to heating systems and approval of tariffs by the National Commission for state regulation in the energy and utilities;
- Production and supply of electricity through the land - use of energy that does not require licensing, network connection and requires the sale of electricity on the wholesale electricity market of Ukraine for the "Feed-in tariff" (power electricity up to 30 kWh per year).

Ukraine for the time being has no specific legislation on the activities of energy cooperatives. However, the existing legislation governing the activities of cooperatives in the country permits the cooperatives to operate of this specialization. Of course, imperfect legislation prevents the development of mass cooperative movement in the energy sector and requires the development of specific legislation.

3.3.2 Existing cooperatives and best practices

The tradition of cooperation in Ukraine has ancient roots especially in rural areas. Namely, cooperative movement, which was widely distributed in Western Ukraine in the early twentieth century, allowed the village to survive the post-war economic crisis and to develop well agriculture and agricultural exports to Europe. Today, cooperation in the energy sector will allow decentralization of energy market in Ukraine, reduce the cost of energy due to their production locally, and contribute to the energy independence of local communities.

4. Current situation in Armenia

4.1. National climate and energy policies

Armenia has signed the Paris Agreement on 23 March 2017. In its already trasmitted NDCs, the country "strives to achieve ecosystem neutral GHG emissions in 2050 (2.07 tons/per capita annual) with the support of adequate (necessary and sufficient) international financial, technological and capacity building assistance (UNFCCC 2017b). Republic of Armenia Law on Energy Efficiency and Renewable Energy, which was adopted on 9 November 2004, aims to identify mechanisms of state policy principles for the development of energy efficiency and renewable energy and the mechanisms of their implementation, targeted at (Armenia Renewable Resources and Energy Efficiency Fund 2011):

- Strengthening the economic and energy independence of the RA;
- Raising the economic and energy safety, energy system reliability of the RA;
- Creation of new industries and organization of services to promote development of the energy efficiency (EE) and renewable energy (RE);
- Decrease negative impact on environment and health of people;
- National Project of Energy Efficiency and Renewable Energy.

There is a National Project of EE and RE, adopted by RA Government in 2007. The main objective of the project is to identify the projective aims of Armenia Renewable Resources and Energy Efficiency Fund (R2E2 Fund) and to identify the ways of achieving them.

According to the main results of guiding the renewable energy development program, the produced energy based on the usage of renewable sources may increase by fivefold in 2020 compared to the current level. In 2010, on the basis of renewable energy sources about 310 GWh of energy was produced, in 2015 about 740 GWh and in 2020 it may reach the level of 1,500 GWh. According to the RA law "About the "Energy", until 1st July 2016 all electricity (capacity) generated at small hydro power

plants, as well as from renewable sources of energy within the next 15 years shall be purchased pursuant to the Market Rules (Energy Law of the RA, Section 11, Article 59 c).

4.2. Situation in rural communities

4.2.1. Energy supply

The closure of two power units of the country's nuclear power plant in 1989 led to structural changes in the energy sector. The main burden for electricity production fell on thermal power plants. In the conditions of stable supply of natural gas and fuel oil from various parts of the USSR, thermal power plants of Armenia - Hrazdan and Yerevan thermal power plants (TPPs), were able to ensure the stability of the energy system of Armenia. However, the energy system of the country was appeared in collapse situation by the suspension of natural gas supplies via Azerbaijan, the violation of the stable operation of the pipeline passing through Georgia, and the suspension of the railway operation linking Armenia with Georgia and Russia. The result was the energy crisis in 1992 – 1994, when the energy capacities were producing only 10 – 15% electricity needed for the economy and the population. It should be noted that compared with the 1980s, in the result of the on-going socio-economic crisis, most of the country's energy producing enterprises currently are not functioning or are functioning not at their full capacity.

The total installed capacity of Armenia's electrical system is 4336.6 MW and 2589.6 MW is manageable power equipment due to long-term operation. For TPPs, installed capacity is 2347 MW. Currently, in thermal power plants, they are burning natural gas imported from Russia and Iran. Hrazdan TPP's installed capacity is 1110 MW (disposable, 370 MW), Yerevan Thermal Power Plant – 550 MW (currently not functioning), the 5th unit of Hrazdan – 445 MW, while in Yerevan it is – 242 MW. Total capacity of all disposable 1380 MW Thermal Power Plant. Now the plant's available capacity is 385 MW.

All installed capacity is about 1182 MW of hydropower, including small hydropower capacity of 222 MW. By 1st January 2014, around 154 small hydropower plants have an installed capacity of 260 MW to produce 720 million kWh of electricity annually.

In Armenia, only the "Lori 1" wind power plant was put into operation with a total capacity of 2.64 MW in December 2005, within the framework of a grant received from Iran and the efforts of Iranian experts. 2014 wind farm's annual electricity production was 3.7 GWh., and its share of 0.06% of the total electricity in production. The wind power is connected to the electricity grid.

"Lusakert biogas" (LBP) was put into operation in 2008 and was the strongest in the region. Its capacity is 0.85 MW, with average annual production of 7 million kWh of electricity.

There is experience in the installation and operation of PV installations in Armenia, but their total power does not exceed 200 kW. The development of PV-installations is hindered by relatively high prices and insufficient ingredients in plants for the purchase of electricity tariffs.

Energy security sphere of Armenia has set itself three main strategic tasks:

(1) Diversification of energy sources, including nuclear energy use.
(2) Efficient, economic and environmentally sustainable development and use of renewable energy sources provides for investments,
(3) Promoting regional integration in the energy sector.

Armenia's issues in the energy sphere are: prevention of security problems in the supply of imported fossil fuels, as well as the safe operation of the Armenian Nuclear Power Plant (NPP). Armenia imports most of its fossil fuel resources from Russia, namely gas, and a small portion of gas from Iran. In 2014,

NPP has met the electricity demand of about 36.2%, while thermal power plants have met around 32.8%. Armenia's government currently considers that there is no alternative to nuclear energy. The plant to bring out the plant has been commissioned in 2016, but in 2013 in September it was announced that the plant's operation was extended until 2026.

By choosing the population of rural areas as a target group (vulnerable from the side of energy poverty) it is expected to establish small decentralized enterprises of energy production with the structure of energy cooperatives and with the participation of youth and women. As a result, both, new vacancies will be established and sustainable income will be ensured for the members of cooperatives, which would contribute to the dissemination of possibilities of the usage of renewable energy.

4.2.2. Gender aspects

The feasibility of energy cooperatives can be a stimulating way of solving the issues of gender equality and the protection of human rights. On the basis of the origin and operation of cooperatives, the existence of equality is given. Cooperative will also allow women who are isolated in an individual work to unite and contribute to reach to a mutually beneficial result.

Energy cooperatives could ensure an operating platform and a healthy environment for overcoming social barriers existing between men and women contributing to the healthy internal functioning and development of community.

In order to maintain gender equality in energy cooperatives from the first day of its establishment, equal number of female and male representatives should be involved if it is possible.

With the same aim, in order to be effective, the members of the cooperative can follow the following examples; if the cooperative accountant is a woman who will contribute to the strengthening the accountant capacities and development of knowledge of male members. Conversely, men share their experience of technical capabilities to female members of the cooperative.

4.3. Energy cooperatives

4.3.1. Legal framework

There is a Republic of Armenia law on the consumer cooperatives. It is as follows: a cooperative meet the needs of no less than 5 consumer members (participants) by goods and services, represents and protects their interests, it is and non-profit legal entity established on a voluntary basis. Consumer Cooperative Participants (members) can be the citizens and (or) individual entrepreneurs and citizens engaged in agricultural production who have signed a contracted on joint activities. The current legislation does not fully regulate the formation of cooperatives, and the relationship of the liquidation process and the need for improvement and replenishment. Legislative reforms will be essential for the stability and development of cooperatives. Cooperative sector is regulated by the following primary legal acts:

The Civil Legislation (HO -239, adopted on 05.05.1998, in force from 01.01.1999). According to the paragraph 3 of Article 51 - "Types of Legal Person’’; "Cooperatives, depending on the nature of their activities, can be profit-seeking (commercial) or non-similar (non-commercial) organizations". Articles 117-121 of the Legislation (paragraph 3) fully apply to cooperatives. Article 117 of the Legislation refers to the basic provisions of the cooperatives, where the definition of cooperatives, contents of cooperative charter are given, as well as reference is made to the characteristics of different types of cooperatives and other laws defining the legal status. Art. 118 of the Legislation applies to the management of the cooperative's property.

Art. 119 of the legislation relates to the management of the cooperative, in particular, the cooperative management bodies, executive bodies, etc.

Art. 120 of the legislation relates to the termination of the membership in the cooperative and the transition units.

Art. 121 of the legislation, which refers to the reformation and dissolution of cooperatives, stipulates that "Cooperatives may be voluntarily reorganized or liquidated by the decision of the general meeting of its members".

4.3.2. Existing cooperatives and best practices

According to the data of State Register, till 1st January 2013, 3.737 producer and 307 consumer cooperatives have been registered (Based on the study of the "Guidelines for Legislative Reforms of Cooperative in Armenia"). How many cooperatives actually work on production and what is the share of agricultural production cooperatives – this number is difficult to ascertain. More consumer cooperatives are registered in Aragatsotn (10.4%), Ararat (11.7%), Armavir (12%), Gegharkunik (12.4%) and Tavush (11.4%) regions.

From the problems that the agri-food field in Armenia it is clear that the development of agriculture and agro-business is connected with the development of cooperatives. In the business sphere, the cooperative can coordinate and organize different activities from producing agricultural products, services and delivering. The implementation of the idea of co-operation is necessary for solving the problems mentioned in the agricultural sector, such as difficulties in selling agricultural products, services, resources and non-affordability of techniques used in basic industry, fuels, fertilizers etc. By creating cooperatives we can solve such problems, same as sales difficulties, technique or fuel issues. In Armenia a lot of international organizations and projects have promoted the idea of creating and developing cooperatives.

5. Current situation in Moldova

5.1. National climate and energy policies

Moldova committed itself to unconditionally reduce its GHG emissions by 64 – 67% below the 1990 level in 2030 and to make the best efforts to reach the 67%. An increase up to 78% as a condition conditional to, a global agreement addressing important topics including low-cost financial resources, technology transfer, and technical cooperation is included (UNFCCC 2014).

Moldova has a well-developed National energy strategy for the period up to 2030, which was updated in 2013. In the same year, Moldova adopted the National Energy Efficiency Action Plan (NEEAP) for 2013 – 2015 and the National Renewable Energy Sources Action Plan (NRESAP) for 2013 – 2020.

Currently, Moldova is transferring EU legislation into national law, because as a member of Treaty establishing the Energy Community, the country prepares for integration into the European energy market. As a pure importer of energy sources, Moldova aims to reduce its imports' dependence by increasing capacity, support of energy efficiency for renewable energy sources, and as well through the integration of regional markets, trying to diversify energy supply sources. NEEAP has been developed in accordance with Moldova's obligations under the Treaty establishing the Energy Community to reduce the final energy consumption in all sectors by 1.8% p.a. over the period 2013 – 2015, comparing with 2009, while NRESAP is associated with the EU Directive for RE support.

Energy objectives of Moldova until 2020 are closely linked with the requirements of Treaty establishing the Energy Community. Moldova became a part of the Treaty establishing the Energy Community in 2009 and in 2012 negotiations regarding deep and comprehensive free trade area (DCFTA) with the European Union began. In June 2014 Moldova signed the Association Agreement with the European Union.

Energy Strategy of the Republic of Moldova until 2030 (hereinafter - the Strategy) provides a clear indication of the energy sector development in the Republic of Moldova with the aim of creating a framework that is necessary to provide economic growth and improve the welfare of the population. In this document the Government of the Republic of Moldova presents its vision and determines the country's strategic opportunities in the energy context, which is exposed to rapid changes in the geopolitical space, that covers Central and South-Eastern Europe, Russia and the Caucasus region. This strategy highlights the priority problems of the country, which require some urgent solutions, as well as changes of the objectives' scopes of, in accordance with the need to ensure the optimal balance between: internal resources (used currently and projected for the future) and urgent needs of the country, the tasks of the European Union, of the Energy Community and national tasks, also international commitments in the framework of contracts, agreements and programs (including the Neighbourhood policy), to which the Republic of Moldova is a part of. Common strategic objectives for the period from 2013 – 2030, and specific strategic objectives for the intermediate time periods (2013 – 2020 and 2021 – 2030 years) are defined, measures for their implementation are also provided.

National energy efficiency program for 2011 – 2020 was developed in order to implement provisions of the Law № 142 from 2nd July 2010 about EE, the Law № 160-XVI from 12 July 2007 on RE and the Law № 117-XVIII from 23 December 2009 about the joining of the Republic of Moldova to the Treaty establishing the Energy community and about and the Energy strategy of the Republic of Moldova until 2020, approved by the Government Resolution № 958 of 21st August 2007.

It sets policy and priority actions, that are going to be implemented in the period 2011-2020, in order to react the challenges of rising energy prices, dependence on energy resources imports and the impact of energy sector on the climate change.

The purpose of this program is to increase energy efficiency by implementing a number of measures for more efficient energy use in the following sectors:

a) Sector of energy transformations, including all related activities: the production of electric and thermal energy, transportation and distribution of electric and thermal energy, natural gas, as well as the final consumption of all types of energy;
b) Industry sector;
c) Construction sector;
d) Transport sector;
e) Public sector.

The program reckons for intersectoral action for 2011 – 2020 and offers a national information strategy, intended for final consumers.

5.2 Energy cooperatives

5.2.1 Legal framework

The cooperative society (cooperative) is a legal entity, and is composed of physical entities or legal entities whose purpose is to promote and ensure economic interests of its members. According to Art. 171 of the Civil Code of the Republic of Moldova, the cooperative is a voluntary association of physical and legal entities, organized by corporate principles in order to promote and ensure, through joint actions of its members, their economic and other legitimate interests. Cooperatives are regulated by the Civil Code of the Republic of Moldova, 1107/2002, Art.171-178; Laws № 73 from 12.04.2001 on the entrepreneurial cooperatives and Nr. 1007 of 25.04.2002 on production cooperatives.

Art.171-178 of Civic Code provisions are considered special provisions on cooperatives, compared with the general provisions relating to the legal entity, but applies to the extent that special laws do not

regulate otherwise. An example is the provision according to which a member of the cooperative can be either private person or legal person. Special laws envisage the formation of cooperative production only by individuals and formation of entrepreneurial cooperative only by natural and legal entities, which are performing entrepreneurial activities. Entrepreneurial cooperatives are true, since their goal of energy saving is aimed at making money and improve the overall efficiency of the work of its members. Farm co-op, in turn, in accordance with the Law № 1007 / 200, look more like a company focused on making a profit and its distribution among its members.

The Entrepreneurial Cooperative

Definition: The entrepreneurial cooperative is a legal entity based, at least on 5 people and / or legal entities that act as entrepreneurs, in order to streamline its activity to obtain profits or savings.

An entrepreneurial cooperative is a legal entity that has a profit; the founders are at least 5 members, who act as entrepreneurs; the coop responds to obligations with all its assets (the cooperative members are not liable for its obligations); It consists of two categories: members should have one common share and preferred share; Associate members have only a reduced share. The entrepreneurial cooperatives can work in all sectors of the national economy. They can participate in any activity except those prohibited by the state monopoly. If for the implementation of the activity license is required, the cooperative will receive it at the beginning of activities.

Art. 4 Law № 6 on co-operative enterprise. 73/2001 provides that participation in the economic relations with the cooperative involves buying of cooperative production (his services) by members or supply (provision) of the members of cooperative production (his services). The basic principle, which is to create a co-operative business, is provided in Art. 6 of the Law on cooperative entrepreneurship № 73/2001, according to this law, cooperative is obliged to deliver (supply) at least 50 per cent of the total production (services) to their own members and / or purchases (profit) from its members, at least 50% of the total volume of purchased products (services received) cooperative.

Art. 7 Law № 73/2001 provides, particularly, that cooperatives can be for the provision of services for the processing, including consulting, savings, loan, insurance, etc. Art. 87 regulates the particularities of agricultural service cooperatives. The cooperative has a share capital. It is the sum of all the shareholdings of members of the cooperative in accordance with its statute.

The Production Co-operative (Law Nr. 1007 of 25.04.2002 on production cooperatives)

A Production co-operative is a company established by five or more physical entities persons to carry out co-production and other economic activities, mainly based on personal labor of its members and co-shares in the cooperative capital (hereinafter -divvy).

Organization and co-operative activity are carried out on the principles of voluntary entry into the cooperative and free exit from it; management of the cooperative activity, based on democratic principles; common interests, economic cooperation and mutual support of its members; free access to information about the activity of the cooperative. Cooperative members may be individuals who have reached the age of 16, corresponding provisions of the cooperative statutes and who contributed to the score of the share.

5.2.2 Existing cooperatives and pilots

Today, in the Republic of Moldova there are no existing energy cooperatives but at the same time there are some individuals taking independent steps to create such communities.

6. Overview of the four countries

The following table gives an overview of the key points concerning the feasibility of gender-sensitive energy cooperatives – the existence of Feed-in Tariffs for renewable energy, the state of national energy supply, Gender aspects, the legal framework for cooperatives and pilot projects - in each of the four countries, Georgia, Ukraine, Armenia and Moldova.

Table 1: Overview of key points in the four countries

	Georgia	Ukraine	Armenia	Moldova
Feed-in Tariffs	/	Yes; Mandatory purchase of electricity suppliers (energy market) from the following sources: Small hydropower (< 10 MW); Wind power plants; Solar power; power plants that use biomass as fuel	/	/
Energy supply	High prices for electricity and gas; inefficient use of firewood		Dependent on energy imports; Safety issues with Nuclear power	
Gender aspects	Women have a low social and economic status; they are disproportionally affected by negative energy-related effects		The feasibility of energy cooperatives can be a stimulating way of solving the issues of gender equality and the protection of human rights	
Legal framework for coops	No specific law on e-coops; provisions within “Entrepreneurs Law of Georgia” or newly adopted Law on Cooperatives	Articles 1 and 2 of the Law of Ukraine "On Cooperation": Production, consumer and service cooperatives can be established in a row of fields of activities	Republic of Armenia law on the consumer cooperatives; The current legislation does not fully regulate the formation of cooperatives, and the relationship of the liquidation process and the need for improvement and replenishment. Legislative reforms will be essential for the stability and development	According to Art. 171 of the Civil Code of the Republic of Moldova, the cooperative is a voluntary association of physical and legal entities, organized by corporate principles in order to promote and ensure, through joint actions of its members, their economic and other legitimate interests
Pilots	Four energy cooperatives founded in 2015	Long tradition of cooperation in Ukraine	In 2013, 3.737 producer and 307 consumer cooperatives have been registered	

7. Technologies

7.1. Solar Water Heaters (SWH)

WECF and its Georgian partner NGOs RCDA, Greens Movement, SDCA and SEMA have implemented energy projects in Georgia since 2008. Together with the German electrician company "Solar-Partner Süd GmbH" a solar hot water collector was developed that can be produced with local materials in the communities by trained craftsmen. Thanks to the heat exchanger with anti-freeze, the collector also works during winter.

Local specialized construction, installation and monitoring teams have developed in 5 regions of Georgia who are constructing and supervising solar collectors of very high quality. They are usually organized around resource centres, and are supported and supervised by WECF partner organizations. By the end of 2014, around 350 solar collectors have been constructed in Georgia.

The construction of the solar collectors was partly sponsored by donor projects. Trials with financial mechanisms that enable poorer households to obtain a solar collector through a flexible pay-back mechanism have been successfully conducted.

With a growing demand for solar collectors but also for other RE and EE technologies and with more people ready to invest while the government is demanding up-scaling, other distribution mechanisms need to be explored.

7.2. Fuel Efficient Stoves (FES)

To give an example, during the winter period, rural population of Georgia uses wood stoves for heating. At the same time these stoves are used to prepare meal and to heat water. If we consider this process lasts for about 8-10 hours daily for 180 days in the winter, every family should take up theoretically 6336 kWh of energy, which corresponds to 3.7 m3 wood timber. In the summer period (185 days), when wood stoves are used for cooking and water heating, the energy demand of the family is 1850 kWh, or 1.1 m^3 of wood timber. Therefore, each family living in urban districts, theoretically requires about 4.8 m^3 of firewood (8186 kWh of energy) for over a year.

In the regions of Georgia, each family annually consumes 10-12 m^3 firewood for household purposes, which is almost 2.5 times higher than the theoretical requirement. If we take into consideration that in Georgian villages there are approximately 470.000 families and more than 500 administrative facilities (schools, kindergartens, hospitals, etc.) just households annually consume 5.6 million m^3 (9.6 billion kW * h) wood. Which not only significantly higher is than woodcutting limits (1mio m^3) and theoretical energy demand, even higher than annual forest growth (4 Mio. m^3). One of the main reasons for such extensive use of firewood is low energy efficiency of common Georgian household wood stoves. Most ovens easily lose the heat and cool quickly. Aiming to maintain the required temperature in the room requires constant control and permanent firewood supply. It does not match the user's needs and is very time and cost consuming.

Considering that e.g. in Georgia the households are main energy consumers, producing solar collectors and building insulation materials can be very promising and commercially successfully. It needschnological and management expertise to build up such a market. Energy cooperatives could be one possibility, running a production plan and offering and selling these services.

7.3. Thermal Insulation (TI) and Energy Efficiency (EE)

Due to global warming and climate change, covering of building with thermal insulation materials gradually becomes important, thus reducing heat losses of the building and therefore simplifies the heating (in winter) and cooling (in summer). The facts assessment e.g. in Georgia shows that a

significant portion (25-30%) of family incomes is spent for consumed energy. If we consider energy expenditure of the household balance, it turns out that 51% of energy is being spent for building/house heating, 22% for lighting, 19% - for water heating and domestic appliances (fridge, TV, air conditioner, etc.) consume 8%. Reducing energy required for home heating means less expenditures to buy firewood, coal, gas and oil. Annual investments in building insulation give an opportunity to save money in long term and to increase household savings in consideration of continuous increase of expenditures on energy (increasing of price for energy carriers).

7.4. Business models

Sales strategy: There is a huge potential for these technologies. Target clients are private households, companies and municipalities. Combined with financial mechanism (like scheduled repayment plans in cooperation with banks or micro-credits) the demand could be increased. A production description, amortisation calculations and roadshows inform the interest target groups about possibilities, advantages, appropriateness and price of the SWH and stoves. Services in high quality increase the credit and confidence, which boosts again this sector.

Some organizations could help and support this market development:

1. Respective national Ministry of Energy
2. Association of renewable energy of Georgia
3. Energy efficiency center Georgia
4. UNDP (United Nations Development Programme)
5. National Association of Local Authorities of Georgia
6. Delegation of the European Union to Georgia
7. United States Agency for International Development
8. Organization – World Experience for Georgia

8. Barriers for public participation

There are manifold barriers for public participation. Social and cooperative structures are fragile and characterized by a deep distrust in authorities caused by the system of the former soviet system. Overall there is a lack of structures and projects with public participation. Energy cooperatives can offer small volume investments as entry point in such democratic funding instruments. In general people distrust to invest in projects and to take loans by banks. They want to be highly independent. Increasing role models like coops could build up the trust for public participation models.

9. Gender-sensitive approach

The goals and targets: What do energy cooperatives want to achieve? Gender-sensitive energy cooperatives are business-driven companies with social and ecological targets. They could achieve the following advantages:

- Reduction of dependence on imported fuel and democratization and diversification of energy supply;
- Reduction of CO2 emission with low expenditures;
- Established, renewable, safe and affordable energy source: Expand RE technology market (e.g. solar collectors, energy efficient stoves, solar dryers, biogas digesters) with high quality and quantity;
- Create safe and climate friendly energy supply for women and citizens;
- Economic and social empowerment (saving costs and time for fuel);
- Give access to these technologies for citizens, especially women;

- Service & consultation for communities in the renewable energy and energy efficiency sec-tor;
- Expand the local value chain / generate and stimulate employment for women and men
- Build-up technical know-how;
- Increase women‘s participation in public life through awareness raising of women and men;
- Advocacy of renewable energy use and raising awareness about environmentally friendly use of nature;
- Education and spread of knowledge.

The cooperatives allow a de-monopolization and democratization of expert knowledge and the entrance of new actors – women, men, youth, etc. - into the energy sector and demonstrate an alternative to the existing fossil and wood energy industry. Becoming energy producers and "prosumers" 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 experience of women responsible for heating, cooking in the households is explicitly considered and helps to tailor the renewable energy solutions in an appropriate way. The increased knowledge and experience about renewable energy raises the acceptance with the broader public, which is important for the transformational process to move towards a decarbonized economy and society.

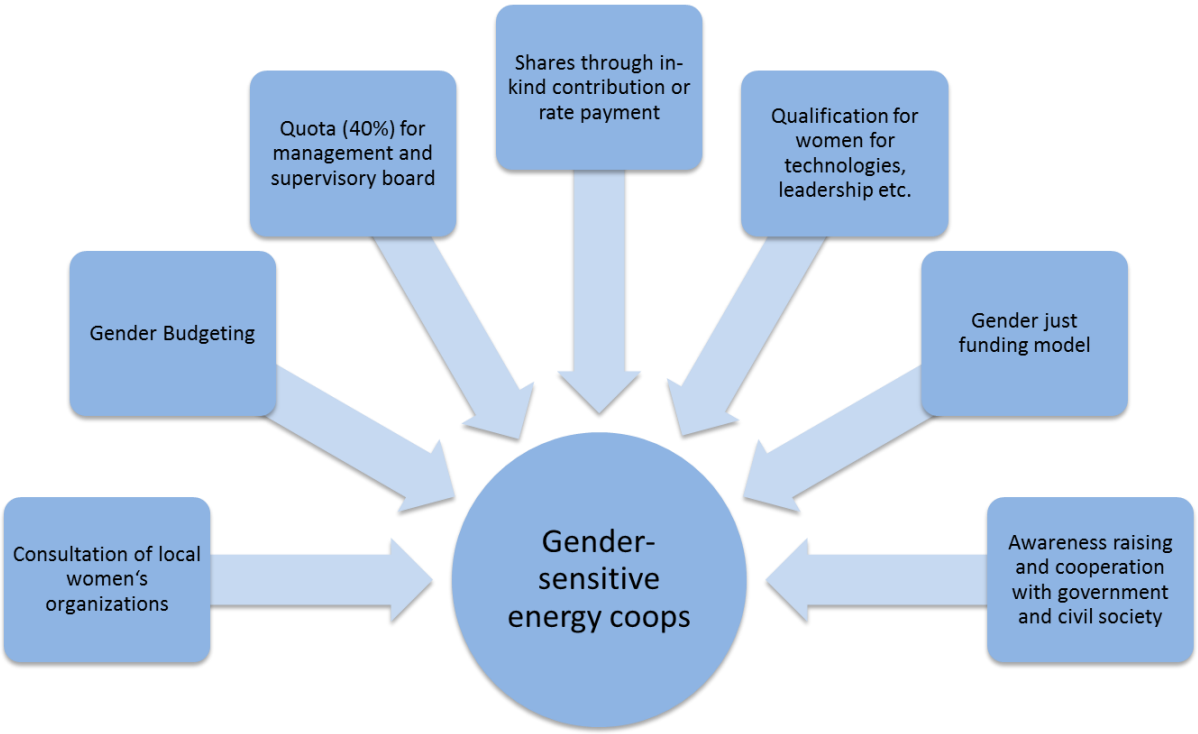

Figure 4: Gender instruments which can be applied for energy cooperatives

10. Conclusion and recommendation

Cooperatives for RE can introduce new forms of socioeconomic organizations in the energy sector (production, distribution and trade) in which citizens are involved in all areas of municipal management and the design of energy resources. This type of self-management of energy sources and systems can have positive social and environmental impacts. Energy cooperatives offer proven advantages in many cases and are both economically viable and robust against macroeconomic instabilities. Not only affecting the energy situation, they contribute to the equal participation of women and men in decision-making processes on a local level. The technological, legal, social and financial situations in the four countries allow the development and establishment of energy cooperatives with various business models. Cross-national knowledge transfer and experience exchange is crucial to establish and support the development of energy cooperatives successfully.

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