Analysis and Guidelines of Financial and Organisational Schemes for Community Energy

IERC
International Energy Research

SEC

Contents

List of acronyms

CEC- Citizens Energy Community

CEP- Clean Energy Package

DCF- Discounted Cash Flows

EBRD- European Bank for Reconstruction and Development

EC- Energy Community

EE- Energy Efficiency

EPC- Energy Performance Contract

ESCO- Energy Services Company

EU- European Union

IRR- Internal Rate of Return

NPV- Net Present Value

NZEB- Nearly Zero Energy Building

OSS- One-Stop-Shops

RE- Renewable Energy

REC- Renewable Energy Community

RES- Renewable Energy Sources

RoI- Return of Interest

TPF- Third Party Financing

1. Background and objectives

Energy communities (ECs) can be understood as a way to 'organise' collective energy actions around open, democratic participation and governance and the provision of benefits for the members or the local community, involving in this way citizens in the energy system.

The Clean Energy Package (CEP) recognises certain categories of community energy initiatives as 'energy communities' in European legislation, which can be summarised in two groups: Citizen Energy Communities (CEC) and Renewable Energy Communities (REC).

Article 2 (11) of the Internal Electricity Market Directive (EU) 2019/944 defines Citizen Energy Community (CEC) as a legal entity that:

- is based on voluntary and open participation and is effectively controlled by members or shareholders that are natural persons, local authorities, including municipalities, or small enterprises;
- has for its primary purpose to provide environmental, economic or social community benefits to its members or shareholders or to the local areas where it operates rather than to generate financial profits; and
- may engage in generation, including from renewable sources, distribution, supply, consumption, aggregation, energy storage, energy efficiency services or charging services for electric vehicles or provide other energy services to its members or shareholders.

On the other hand, Article 2 (16) of the Renewable Energy Directive (EU) 2018/2001 defines Renewable Energy Community (REC) as a legal entity:

- which, in accordance with the applicable national law, is based on open and voluntary participation, is autonomous, and is effectively controlled by shareholders or members that are located in the proximity of the renewable energy projects that are owned and developed by that legal entity;
- the shareholders or members of which are natural persons, SMEs or local authorities, including municipalities;
- the primary purpose of which is to provide environmental, economic or social community benefits for its shareholders or members or for the local areas where it operates, rather than financial profits.

While the primary purpose of both CECs and RECs is the same, RECs can be considered, to some extent, as a subset of CECs however there are some differences between them:

- RECs have a narrower geographical scope than CECs.
- SMEs can effectively control a REC, while this is limited to small and micro enterprises in the case of CECs.
- There is a stronger obligation for Member States to promote the development of RECs, not just provide a level playing field (contrasted with CECs).
- Member States are also required to take RECs into account when designing their national renewable energy support schemes.
- In exchange for these additional benefits, the eligibility requirements for qualifying as a REC are more restrictive.

The analysis and guidelines presented in this document draws from the evidence and information gathered within the UP-STAIRS project about existing financial models applied by different community energy OSS across Europe.

The objectives of the analysis were:

- To establish criteria to be assessed regarding collective financial schemes classification;
- To outline the main steps to be taken when establishing the OSS reading financial framework;
- To provide information on the different possibilities of organisational forms for existing and future energy communities.

These lessons learned, regarding financial schemes for collective action, can be used for future community energy OSS, that aim to replicate or to expand what has been done in UP-STAIRS in new regions or jurisdictions.

Furthermore, the document will provide some basic concepts on economic appraisal techniques, in order to provide a generic approach to assessing the financial viability of an energy efficiency or RES community project.

2. Methodology

In order to support identification of the most appropriate financial schemes for collective action initiatives in OSS, the procedure has been divided into three different steps:

1. Determination of the main criteria to be taken into account when selecting financing options.
2. Review of local context related to financial mechanisms and advice.
3. Matching the financing options criteria with the local context.

3. Criteria selection

3.1. Criterion 1: OSS objective - EE in buildings or RE in buildings

The main OSS objective, that is either energy efficiency measures or the deployment of renewable energy technologies, has an impact on the financial mechanism(s) that could/should be used, either on their own or in combination as explained below:

- Housing owner financing. This is the simplest method and relevant to both types of OSS, in which only the house owner provides the money to carry out the project.
- Third-party funding (TPF) and Energy performance contracting (EPC). Relevant to EE in buildings. This method can be applicable when owners do not have their own money to invest or comply with bank requirements or grant programmes, which sometimes is difficult to fulfil. In this way, the technical risk is transferred to an ESCO, who should have more financial capability to support the development. It should be noted, that in some instances, the ESCO may not be able to fully deliver the anticipated energy and economic savings and instead potentially providing improved comfort to the home owners at the same energy consumption which is a financial risk for the ESCO;
- On-tax funding. Relevant to EE in buildings. This method is applied by national or regional authorities with certain legislative power on tax legislation to stimulate energy refurbishments

of private households. In most cases it is not within the power of the local authorities creating the OSS, who can only benefit from it if it is already in place.

- Crowdfunding. Applicable both to EE and RE in buildings. This method is of special interest for energy community projects with several good examples across Europe (e.g. RESCoop, Mecise or Oleada Solar). Again, it is very much dependent on the existing legal framework in the country for citizens' cooperatives. However, it is expected to gain momentum with the gradual harmonisation of countries' legal frameworks with the European one and, more specifically, with Directive (EU) 2019/944 on common rules for the internal market for electricity, which provides the legal foundations for distributed energy technologies and consumer empowerment.
- Grants/feed-in tariffs. Applicable both to EE and RE in buildings. Extensively applied so far with proven results. Nonetheless, it is important to take into account that public money will not be enough to refurbish all of the building stock throughout Europe. For this reason, efforts have been made to maintain progress towards sustainable business models for EE improvements and RE installations, in order to attract private capital through different financing schemes.

3.2. Criterion 2: Implementation method used

This method is related to the type of funding and the distribution of technical and financial risk between the project owners/households and the financiers. Within the method, there are two different options:

- Separate contracting. The funding can be own funding, bank loan or grant, and the risk is born mainly by the project owners/households;
- Energy performance contracting (EPC). The funding is provided by the ESCO who bears the technical and financial risks of the implementation of energy refurbishment measures.

3.3. Criterion 3: Single family or multi-family buildings

The main difference between the energy refurbishment of single-family houses and multi-family buildings are, in the case of the latter, the challenges related to the multiple ownership and the need to persuade many households and co-owners to form an energy community and to implement energy renovation and RES to the entire building.
The most significant consideration related to the financial mechanism is that funding bodies usually require one single counterpart to negotiate with, so in case of multi-family buildings, there is a need to establish a legal body representing all co-owners for the financial institutions and other relevant authorities to engage with if one does not already exist.

3.4. Criterion 4: Targeted level of ambition

This criterion refers to the percentage of savings targeted with the financial scheme that the OSS will look to implement. It is relevant to OSSs for EE in buildings. It can range from a 30 % reduction of energy consumption, 60 % reduction, 75 % reduction to Nearly Zero Energy Building (NZEB).

3.5. Criterion 5: OSS incorporate a funding vehicle or rely on external funding

This criterion is closely related to the degree of financial support services offered by OSS:

- If the OSS incorporate a funding vehicle, it usually provides also cost and Return on Investment (RoI) calculations.
- If the OSS does not incorporate a funding vehicle and does not have partnerships with specific funding institutions, usually the assistance for households is limited to information on different options available for funding and on their requirements and conditions. Furthermore, assistance in administrative procedures to apply and receive the funding is also usually provided.

4. Economic Appraisal Techniques

Economic appraisal is the process whereby a range of investment projects are evaluated and ranked according to measures of financial return. These measures allow the project owner and its investors and lenders to use a common set of values to make financial comparisons between different projects. It should be borne in mind however that the project benefits assessed as part of these appraisal techniques focus on the financial aspects only and non-financial benefits are not considered which is a limitation of the approach.

Thus, in order to give funding, financing institutions require the project to undergo economic appraisal according to commonly accepted methodology by commercial banks. The methodology presented here is based on European Bank for Reconstruction and Development (EBRD) guidelines applicable to local commercial banks operating credit lines for energy efficiency improvements and RES projects on behalf of EBRD or other big international financing institutions like European Investment Bank, etc.

In this way, the aims of economic appraisal techniques are:

- To determine which investments make the best use of money;
- To ensure optimum benefits from each of these investments;
- To minimise risk to the project owners and financiers; and
- To provide a basis for the subsequent analysis of the performance of each investment.

Nonetheless, economic appraisal is not an absolute measurement of quality of an investment project; it is always relative to the whole range of possible projects open to the project owner. Therefore, the main functions of the appraisal process can be summarised as follows:

- It allows for different people with different backgrounds and self-interests to agree on a ranking of the range of possible projects;
- It gives to project owners an indication on the “bankability” of a project, i.e. on its chances to be financed by banks (where banks do their own assessments).

The economic feasibility or profitability of a project is determined by the difference between project costs and project benefits, this is the cost/benefit ratio. The project benefits result from reduced energy consumption of the company and/or from avoiding energy purchases and costs through own production from RES. On the other hand, the project costs depend on the following factors:

- Capital costs and depreciation.
- Energy and fuel costs: gas, oil and electricity.
- Operating costs: maintenance, materials, labour, service utilities, storage, handling, etc.

The following sections present the most common criteria and methods to evaluate the profitability of this kind of projects.

4.1. Simple payback

The first step in any investment appraisal is to gather the appropriate information on the project costs and benefits and calculate the cash flow generated by that project. In the simplest terms, the cash flow is the difference between the money coming in and the money going out of the investment project.

Additionally, the payback can be defined as the period of time required for the reduced fuel consumption and/or fuel costs savings to cover the initial capital costs of the project. It is called "investment pay-back period" and it is calculated as indicated below:

- Payback = Capital Cost/Annual Savings

The advantages and disadvantages of the simple payback method have been summarised in the following table:

Advantages	Disadvantages
Easy to calculate	Does not account for the time value of money
Interpreted in tangible terms, i.e., years	Does not indicate a rate of return on the money invested
No requirement for assumptions about the project in terms of timing, lifetime or interest rates	No account of the residual value in the capital asset: investment salvage value
It favours projects with a short payback time, which reduces the uncertainty of calculating savings for periods a long time in the future. The effects of changing technology and fuel prices are reduced	No account of any cash flows after the payback period (cut-off date) and therefore does not assess the overall value of the project

4.2 Discounted Cash-Flows (DCF)

A basic principle of finance is that money has time value: a certain amount of money in hand today (cash) is always worth more than an equivalent amount of money a year from now. In other words, the bank should be able to charge a market related price for the use of its money.

Thus, the interest rate is defined as the main charge for the use of the lender's money stated as a percentage rate.

The Discounted Cash-Flows (DCF) methods take into account the time value of money and are based on interest rates. There are two main DCF methods, mutually connected:

- Net Present Value Method (NPV)
- Internal Rate of Return Method (IRR)

The Net Present Value (NPV) method is about calculating the present value of all yearly capital costs and net savings throughout the life of a project. By summing all the present values (costs are

represented as negative amounts and net savings as positive), a total will be obtained which is called the NPV of the project. NPV is calculated by:

1. Forecasting all cash flows generated by the investment projects;
2. Discounting these cash-flows with the appropriate opportunity cost of capital. The expected future cash flows are discounted by the rate of return offered by comparable investment alternatives. This rate of return is often referred to as the discount rate, hurdle rate or opportunity cost of capital.

$$NPV = \frac{Cash\ Flow_1}{(1+r)^1} + \frac{Cash\ Flow_2}{(1+r)^2} + \frac{Cash\ Flow_n}{(1+r)^n} - Initial\ Investment$$

Where:

- Cash Flow is the sum of money spent and earned on the investment or project for a given period of time.
- n is the number of periods of time.
- r is the discount rate.

The bigger the risk involved in a project, the bigger the return expected by the investor. Therefore, interpreting the results of the NPV:

- Negative NPV: The present value of the net savings (cash inflows) generated by the project during its life-time is less than the initial capital costs (initial cash out-flow). The project should be **rejected**.
- Positive NPV: not automatically accepted but put forward for **further consideration**.

The Internal Rate of Return (IRR) can be defined as the discount rate which will make the NPV of a project equal to zero. It represents the rate that money would have to earn outside or elsewhere in the organisation to be a better investment. The higher the IRR on a project, the more economically feasible the project.

Nevertheless, there is not a direct way of calculating IRR. Its estimation is based on the DCF method and it is necessary to carry out successive approximations, either manually or by a specific software, repeating the calculation with different discount rates until the NPV is zero.

The project owners should accept any investment offering an IRR in excess of the opportunity cost of capital.

4.3 Major factors impacting economic appraisal

Apart from the methods to predict the profitability explained above, there are other relevant major factors that can impact economic appraisal on RES and energy efficiency investment projects:

- Government grants. NPVs will be improved by reducing the initial capital costs of the project.
- Taxes. Taxes can have both negative and positive impacts on economic appraisals. For example, the additional cost of tax on net savings will decrease the attractiveness of a project. On the other hand, tax incentives (e.g. tax allowances) will enhance attractiveness. It is important always to forecast the cash flows on an after-tax basis.
- Variability of energy prices. This is the most unpredictable and critical factor:
    - Low prices lead to lack of incentives in energy savings and/or RES as they decrease the economic feasibility of community energy projects.

- The higher the prices are, the bigger the profitability of community energy projects is, when other terms are kept equal.

Technologies can switch the value of NPV from negative to positive because of energy prices increases.

5. Organisational forms for energy communities

Several organisational models enable citizens' participation in community energy projects. Depending on the legal form chosen, the energy communities can differ in terms of governance structure, decision-making and liabilities.

Assessing the existing energy communities across Europe nowadays, the following are the most common legal forms that can be found:

- Energy cooperatives. This is the most common and fast-growing form of energy communities. This type of ownership primarily benefits its members. It is popular in countries where renewables and community energy are relatively advanced.
- Limited partnerships. A partnership may allow individuals to distribute responsibilities and generate profits by participating in community energy. Governance is usually based on the value of each partner's share, meaning they do not always provide for a one member - one vote.
- Community trusts and foundations. Their objective is to generate social value and local development rather than benefits for individual members. Profits are used for the community as a whole, even when citizens do not have the means to invest in projects (for-the-public-good companies).
- Housing associations. Non-profit associations that can offer benefits to tenants in social housing, although they may not be directly involved in decision-making. These forms are ideal for addressing energy poverty.
- Non-profit customer-owned enterprises. Legal structures used by communities that deal with the management of independent grid networks. Ideal for community district heating networks common in countries like Denmark.
- Public-private partnerships. Local authorities can decide to enter into agreements with citizen groups and businesses in order to ensure energy provision and other benefits for a community.
- Public utility company. Public utility companies are run by municipalities, who invest in and manage the utility on behalf of taxpayers and citizens. These forms are less common, but are particularly suited for rural or isolated areas.