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TERMS OF REFERENCES

"National consultant to assist in conducting a pre-feasibility study for the possible solutions for piloting energy cooperatives in Moldova"

Job title:	National Consultant in distributed energy systems (energy cooperatives)
Type of Contract:	Individual Contract (IC)
Assignment type:	National consultant
Section/Unit:	Environment and Energy Cluster
Site visits:	At least 3 (three) to 5 (five) field visits in local communities with potential for energy cooperatives
Languages required:	English and Romanian, working level of Russian will be an asset
Starting Date:	January 2020
Duration of Assignment:	50 working days till June 2020
Payment arrangements:	Lump sum contract (payments linked to satisfactory performance and delivery of outputs)
Evaluation method:	Desk review

I. Background

The dramatic decrease of specific technologies such as wind and solar power in past 8 years and similar plummeting in costs for storage technologies, EU started to rethink its energy and climate change goals by focusing more on decentralised energy systems, small scale local production and consumption, digitalization of energy services, decarbonised energy mix and citizen empowerment with the benefits of the transition to a cleaner energy future. The EU set of documents that encapsulates all these changes and will determine the EU energy strategic directions by 2030 is called "EU Clean Energy Package" and is expected to enter in force by 2020. Win-win situations could be identified for Moldova to profit from these changes.

The Republic of Moldova is poorly endowed with conventional energy resources, and highly dependent on imported energy. The electricity sector of Moldova is fully dependent on external energy sources. Domestic supply sources consist of several combined heat and power (CHP) plants and some renewable energy units covering up to 20% of domestic consumption. The rest of demand is met by electricity procured either by imports from the Cuciurgani-Moldavskaya GRES gas-fired power plant, owned by the Russian company Inter-RAO and located in Transnistria or from Ukrainian suppliers such as DTEK. Similarly, Moldova is still largely dependent on gas supplies from the Russian Federation. In 2018, all of the 1.1297 Bcm needed for

consumption on the right bank of Dniester River were acquired from Russia's Gazprom. Another 2 Bcm were delivered by Gazprom to Transnistria and mainly used for electricity generation. Only around 25% of primary energy consumption is supplied through indigenous resources, 98% of which is biomass, mostly used for heating purposes in the rural areas.

Renewable energy could be one solution to tackle the energy challenges of Moldova. In this regard, Moldova committed to reach a binding target of 17% of energy from renewable sources in gross final energy consumption by 2020. By 2018 this target has been already achieved. There is also a nonbinding target of 10% of gross electricity consumption to be covered from renewable sources in 2020, but this is far from being reached, the current level being 2%. The main source of energy that allowed Moldova to achieve its commitments relates to biomass. A significant contribution in this regard was brought by the project of UNDP "Energy and biomass" and financed by EU between the years of 2011 – 2018. This suggests that Moldova could start thinking, planning and committing to more ambitious goals by 2030.

For the period 2021 – 2030 the Energy Strategy of Moldova has three specific objectives:(i) to ensure an enhanced use of renewable sources; (ii) to improve energy efficiency; (iii) to introduce intelligent power networks. As the Strategy recognizes for the Republic of Moldova, the use of local renewable energy sources has first of all the goal to ensure the security of supplies. Other public social and economic benefits of the RES development, such as a lower impact on the environment, the creation of new industries and enterprises, positive structural consequences on regional economies and the creation of jobs, are good reasons to support RES in the country.

In 2018, Moldova started together with IRENA a Renewable Readiness Assessment of the Republic of Moldova. This exercise aims to identify the needed actions to overcome the barriers that impede the development of this sector in Moldova. Moldovan Government also is working actively to update the Energy Strategy 2030. This would be the momentum for Moldova to be bolder and pay more attention to distributed energy systems, business models focusing on energy communities at local level, having in this regard specific targets, policy and support mechanisms for this sub-sector.

In this respect the energy cooperatives could have a transformative impact on the whole Moldovan power sector. The main implications in case of an energy cooperative would be to create a source of local development, energy self-sufficiency, potentially smaller energy bills. The impact would be less energy imports, less debts and more local production, transparency and control over energy resources.

II. Scope and objective of the assignment

The overall scope of the assignment is to investigate the best practices of innovative business models focused on distributed energy systems in Czech Republic and West European countries and identify the best ways to replicate them in Moldova.

More specifically there will be determined **the existing** and **the needed** technical, economic and legal prerequisites for different scenarios of energy cooperatives in Moldova.

III. Approach and methodology

The national consultant will support the international consultant and assist him during field visits in Moldova, collection and analysis of information, interaction with national institutions and local communities, meetings with energy market participants and other donors active in the energy sector of Moldova. Up to 5 visits in the field during the assignment might be needed.

The national expert may provide solutions tailored to the local environment and habits from Moldova.

Technologies that could will be considered for modellings will be the following:

(1) Solar PV panels
(2) Solar thermal panels

(3) Wind turbines (small/urban wind turbines)
(4) Heat pumps
(5) Energy storage batteries
(6) Hot water tanks
(7) Combined Heat & Power (CHP), including small scale CHPs
(8) District heating systems
(9) Electric vehicles
(10) Seasonal Thermal Energy Storage (STES)
(11) Electric boilers
(12) Biogas production units
(13) Biomass heating stoves
(14) Cooling systems
(15) Heat recovery ventilation

The national expert may provide solutions tailored to the local environment and habits from Moldova.

The consultant will give priority to the technologies that already exist on the Moldovan market and will model two-three scenarios for each of the proposed 3-4 energy cooperatives with the cheapest and the lowest cost of combining these technologies.

The analysis will focus also on the costs and economics of each proposed scenario. Recommendations on the financing modes will be useful.

The aim of the assignment is not to create totally off-grid communities, but rather to use the existing grids in Moldova. The electrification rate is almost 100% in Moldova.

During the assignment the following tasks will be conducted by the consultant:

(1) Asist the international consultant in conducting economic and system (technical) modelling covering the following building blocks:

i. *Production vs consumption*. Model and estimate the annual energy production and the energy consumption of an energy cooperative covering the needs of a local community with neighborhoods starting with 50 people to communities ranging from 500 to 2000 inhabitants.

$$Grade_{prod} = \frac{Total\ production\ [MWh]}{Total\ consumption\ [MWh]} \cdot 10$$

ii. *Self-sufficiency*. Estimate the volume of energy needed so that a cooperative could cover entirely (100% self-sufficient) or partially (50% to 70%) the energy needs of its members.

$$Grade_{sc} = \frac{Total\ self\text{-}consumption\ [MWh]}{Total\ consumption\ [MWh]}$$

iii. *Capital investment*. Estimate the costs of the system or how expensive is the system to build, considering the data of points i and ii

$$Grade_{CAPEX} = 10 - \frac{CAPEX_{current}\ [EUR]}{CAPEX_{traditional}\ [EUR]}$$

iv. *Pay-back period*. How long would it take for the cooperative to recover the investment and to be cheaper than the traditional system

$$Grade_{PBP} = 10 - \frac{PBP\ [Years]}{2}$$

v. *Impact on existing grid.* The national consultant will review the existing technical studies made available by the contractor and may produce as well original modelling to assessing the reliability of the forecast of own electricity production. This part could consider as well proposal for "peer-to-peer" or local energy trading between the members of the cooperative.

(2) Past local best practices. Case studies.

i. Identify and summarise past and existing best practices on local energy production incentives in Moldova. This will include biomass projects, biogas projects, solar and other incentives. The national consultant will assess their impact and evaluate to what extent they could be the foundations of establishing the energy cooperatives in Moldova.

ii. Assist the international consultant to analyze 3-4 different models of energy cooperatives that could combine various energy technologies (e.g. biomass, biogas, wind, solar) and different legal statuses (limited trade companies, partnerships of civil law, public organizations) to understand which of these models would better fit the needs and realities of local communities in Moldova.

(3) Legal landscape, support mechanisms, financing models

i. Assist the international consultant to investigate the existing policy, legal and regulatory energy polies and their weaknesses and propose the minimum set of policy, legal, regulatory measures so that energy cooperatives have a minimum starting point in Moldova.

ii. Identify the current market support mechanisms in Moldova, asses them indicating pluses and minuses and specify the gaps that should be filled so that community energy should be eligible for these support mechanisms.

iii. Will work together with the international consultant in identifying possible financial schemes after the piloting stage allowing access to affordable finance to potential investors in energy cooperatives.

(4) Final Report

Based on the preliminary analysis of energy policies, market landscape and electricity (energy) system of Moldova support the international consultant to propose a project concept (ideally a project document) aiming to pilot a few models of energy cooperatives in Moldova

IV. Expected deliverables

	Deliverables	**Timing**	**Deadlines**
1.	Economic and system (technical) modelling	25 days	February/March 2020
2.	Past local best practices. Case studies.	5 days	March 2020

3.	Legal landscape and support mechanisms in Moldova	10 days	April 2020
4.	Final Report	10 days	May/June 2020
		Total 50 days	

Note: The dates of the missions will be proposed by the national consultant (and coordinated with national consultant) as part of his technical offer and consulted with the Project manager prior to contract signature.

All of the deliverables will be prepared in both English and Romanian.

V. QUALIFICATION CRITERIA

Academic qualifications:

- At least master's degree in power engineering, energy systems, energy economics, energy management or other related fields.

Experience:

- At least ten (10) years of professional experience in energy industry, consulting services, research, design of decentralised or distributed energy systems and/or other related fields;
- At least five (5) years of experience in the international state-of-the-art approaches and best practices in distributed energy systems, modelling, policy design.
- Previous working experience with international consultants, donors, bodies responsible for public policies in the field of energy and research/consulting projects will be an asset.
- Demonstrated experience and success in the engagement of and working with the private sector and local communities on tasks related to distributed energy systems.

Language skills

- Proficiency (verbal and written) in English and Romanian; working level of Russian will be an asset.

VI. APPLICATION PROCESS

Applicants shall submit the following four documents:

Required

1. Offeror's Letter confirming Interest and Availability;
2. CV, including information about past experience in similar assignments and contact details for at least 3 referees;
3. Brief description of approach to work/technical proposal of why the individual considers him/herself as the most suitable for the assignment, and a proposed methodology on how they will approach and complete the assignment.
4. Financial proposal (in USD, specifying the total lump sum amount as well as the requested amount of the fee per day). Financial proposal template prepared in compliance with the template in Annex 3

If an applicant is employed by an organization/company/institution, and he/she expects his/her employer to charge a management fee in the process of releasing him/her to UNDP under Reimbursable Loan Agreement (RLA), the applicant must indicate at this point, and ensure that all such costs are duly incorporated in the financial proposal submitted to UNDP.

VII. ANNEXES TO THE TOR

Annex 1- Individual Consultant General Terms and Conditions
Annex 2- P11 form or CV
Annex 3- Financial proposal template