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Federal Department of Economic Affairs,
Education and Research EAER

State Secretariat for Economic Affairs SECO
Economic Cooperation and Development
Infrastructure Financing

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SREP Investment Plan for Armenia

We thank Armenia for a well prepared Investment Plan.
We understand and value the efforts that were made to produce a document that addresses the needs of the country and is consistent with the strategies already pursued.

Prior to the decision about the endorsement, we have the following questions (Q) and comments (C):

1. RE resource potential in Armenia
    a. C: The identified capacity for small hydro power (100 MW) is lower than the target for 2020 (377 MW). This would indicate a much larger potential for small hydropower than indicated. Please explain.
    b. Q: It is noted that utility-scale solar potential depends on the deployed PV technology. What is the potential in each of the three cases (fixed PV, single-axis tracking PV, concentrated PV)? Which technology is proposed for the investments to be supported with SREP contributions?
    c. Q: What are the estimates of the energy potential (in an equivalent to power capacity) for geothermal heat pumps and solar thermal heating/hot water technologies?
    d. Q/C: For geothermal potential, the stated figures assume flash technology is used. This requires a high temperature resource. What would be the estimated potential if the temperatures of the identified resource were not high enough for flash technology and binary plants would have to be deployed? Note: It shall be noticed that at 150 MW the overall geothermal potential of Armenia is in any case very small.

2. RE targets in the Government Strategy for RE
    a. Q: What is the presently installed capacity for each of the listed RE technologies in table 3.5 (p.37)?
    b. Q: How realistic do you see the targets of bringing the RE energy share in Armenia's energy mix (excluding large hydro power) up from 6% in 2012 to 21% in 2020 and 26% in 2025? What important power plants are expected to be put on the network until 2020?
    c. Q: It is noted that the GoA targets to install 50MW of geothermal power until 2020. How consistent is this with the fact that in the SREP IP it is foreseen to set-up a plant of only 28 MW after the resource of the most promising site (Karkar) is proven, a PPP is structured with a private sector operator and the plant is built and connected to the grid? What other options of geothermal development, as advanced as the Karkar proposition using SREP grant (if approved) does the GoA have in the pipeline?

3. Ranking of RE technologies against selection criteria
    a. Q: We noticed that the ranking of geothermal heat pumps, solar thermal heating and distributed solar PV has been adjusted (to worse) between the draft and the final versions of the IP. Please explain and substantiate these adjustments.

b. C: We do have concerns that the criterion "market maturity/immaturity" has been overweighed and possibly even wrongly interpreted in the ranking. In the SREP design document, it is explicitly mentioned the SREP should support established RE technologies with large scale-up potential. Therefore the prioritization of the least established (i.e. non-incepted) technologies seems to be contradictory with the request of a large scaling-up potential and also of readiness. This is particularly problematic since the GoA justifies the selection of geothermal development against better ranking technologies (e.g. geothermal heat pumps) only by applying and overweighting this criterion.

c. C: It is noticed that geothermal heat pumps rank highest by a large margin as RE technologies to be suited for a SREP contribution and that despite this high ranking it was not selected. The justification is that this sector, along with solar thermal, has already sufficient/substantial support from the MDBs and the private sector. On the other hand, it is also stated that so far only one commercial-scale geothermal heating facility has been realized in Armenia. This raises the question of how much support is sufficient and indicates that there could very well be a significant potential for scaling-up these highest ranking technologies. We would like to have an appreciation by the MDBs (WB-IFC, ADB and EBRD) as well as the GoA of this aspect.

d. Q: What stakeholders have been consulted regarding the substance and the sufficiency of funding for the geothermal heat pump and solar thermal sectors? Is there a summary of the statements of the different groups of stakeholders in this respect? What is/was the position of the independent observers?

e. C: it is stated that the deployment of utility-scale solar PV in Armenia has the potential to create an entire industry in terms of job creation. We doubt that the construction of a limited number of large plants will have this effect. An "entire industry" will be created most likely with technologies that offer large replication potential and easy access to small and medium sized private enterprises in its deployment. This is the case for geothermal heat pumps, solar thermal and distributed solar PV systems, as correctly assessed in the ranking.

4. Geothermal power development

a. Q: Please substantiate the expectations that the private sector will make the capital investment (power plant) if the resource potential is confirmed (at 28 MW) and that the MDBs (IBRD, ADB, EBRD) or their commercial arms will be ready to support the project with loans. Are there any statements of intent by private sector investors in this direction? What are the positions of the cited MDBs?

b. Q: With regards to your (GoA) answers to the issues raised by the independent expert, do you have any indications about the probabilities whether the Karkar resource is high temperature or low/medium temperature?

c. C: Please provide a copy of the ISOR (Iceland) assessment on which you base your statement about the justification for exploratory drilling.

d. C: Given the low potential, the still unproven nature of the Karkar geothermal resource (temperature), the SREP investment in the proposed geothermal power development component seems extremely risky and likely to end up in a single 28 MW pilot plant in the best case. Even in this best case, there would be no transformational impact. Therefore, we strongly support the recommendation of the independent expert regarding the reduction of the geothermal power development component in the IP.

5. Utility-scale solar PV
    a. C: It is doubtful that the construction of 40-50 MW of utility-sized solar PV plant will have a sufficient impact on the long-term supply costs of solar PV products sufficient to make the technology commercially viable.
    b. C: Utility-scale solar PV will contribute to job creation but a scale-up in this respect will happen only in conjunction with distributed solar PV. It is therefore recommended to identify and favor synergies with the (existing) distributed solar PV sector in the implementation of the utility-scale solar PV program.
6. Other technologies
    a. C: Having noticed that geothermal heat pumps and solar thermal heating technologies ranked highest in the appraisal of potential RE technologies, we do not understand why none of these technologies appear in the IP.
    b. C: We see in these technologies a particularly large potential for scaling-up, precisely because the have already been successfully incepted in Armenia.
    c. C: We see in these technologies a larger potential for the private sector and job creation than in any of the proposed technologies in the IP.
    d. C: We therefore recommend to integrate the geothermal heat pump technology into the IP, instead of the geothermal power development and to propose an incentivization program to induce the private sector to deploy this technology in Armenia.
    e. C: As the independent expert also indicated, small hydro power could be another sector where a scaling-up, supported by SREP, could yield promising results. We feel that this potential was underestimated in the IP.
7. Improvement of enabling environment for RE
    a. Q: What specific measures are planned by the GoA to improve the enabling environment for RE, both for utility-scale plants and for distributed power generation?
    b. Q: What about targeted incentives, such as duty and VAT exemptions for renewable energy investment goods?
8. Financial Plan
    a. Q: Why are no private sector investments and commercial loans foreseen in the utility-scale solar PV project share of the WB, contrary to the program managed by the ADB?
    b. C: Given the lack of any details, we consider that the USD 106 million foreseen for the geothermal power development is/would be essentially a funding gap with high uncertainty regarding its materialization. This amount should thus not be included as a leverage investment in the IP.
    c. What is the share of grant and capital requested by the GoA and what components are foreseen to benefit of grants/capital?