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| **Descriptive form** | |
| **Program name** | HORIZON-CL5-2023-D3-01-03: |
| **Call module** | HORIZON-CL5-2023-D3-01-03: Floating PV Systems: |
| **Website of program** | https://ec.europa.eu/info/funding-tenders |
| **Project name** |  |
| **Project duration** | Max 36 months |
| **Aim of project** | This project has three purposes: Firstly; is the development of clean energy systems to achieve the zero emission target and also It is aimed to contribute to the energy production of Istanbul by means of the generation and storage of energy through photovoltaic panels.  Secondly; Open ground is considered as an opportunity to generate energy from the sun as there is no inconvenient or land constraint. Therefore, it is aimed to expand the potential application areas by developing floating PV technologies on inland waters, which are shown as open areas.  Thirdly; In order to protect the existing resources efficiently against water scarcity, it is aimed to reduce the evaporation of water resources in summer by covering some of the surface areas of the dam lakes with FPV. In this way, it is aimed to increase the biodiversity in the dam lakes and also to increase the urban resilience and to contribute to the adaptation of water resources to the effects of climate change.  Reducing the evaporation values on the surface of the dam lake, which is used as drinking water in the application environment, due to the temperature effects and wave-induced incompatibility losses of FPV is among the objectives of the project. It is also significant for the project to develop and verify predictive yield models, including the dynamic behavior of the exposed wave (wave height class) and wind loads.  The scope of the project is to develop innovative technologies for FPV's low production and construction costs, improving technical performance and increasing energy efficiency.  In addition, if solar energy is preferred, it is thought that the power plant that will generate electricity will directly feed the system that will consume it. In this case, there is a need to store the generated electricity and quite expensive solutions emerge. |
| **List of partners and a brief explanation of their role in the project** | 1. ODTÜ-GÜNAM 2. Zorlu Energy 3. Istanbul Water and Sewerage Administration (ISKI) 4. Potential Partner-1 5. Potential Partner-2 6. Potential Partner-3   In this project;  ODTÜ-GÜNAM  Zorlu Energy:………………..  İSKİ will support the project in providing the necessary area for the dam lake selected for the project located within the drinking water basins and operating the pilot facility with the necessary research and analysis studies. |
| **The expected role of the Potential Partner-1** | The potential partner will be responsible to taking an innovative approach to FPV |
| **The expected role of the Potential Partner-2** | The potential partner is the Battery manufacturer and will be responsible for the production of a new battery. |
| **The expected role of the Potential Partner-3** | The potential partner will be responsible for the development, production and installation of FPV systems for the project. |
| **Brief Information About the Project** | Energy expenditure occupies a significant place in the ISKI budget. One of the methods to reduce energy costs in the facilities is the use of renewable energy resources, which will be introduced at ISKI. During the summer months, 400 thousand tonnes of water evaporate in the dams every day. ISKI is working to establish a surface solar power plant that will both prevent evaporation and generate electricity with the floating solar power projects. For this purpose, it can be placed in the catchment area and on the lake, with PV modules being preferable to the solar power plant. In this way, water loss through evaporation can be prevented.  Taking into account the areas covered by the drinking water dams in Istanbul at normal water levels, Büyükçekmece Dam has an area of 43 km2, the Terkos Dam 30 km2, Ömerli Dam 23 km2, the Sazlıdere Dam 11.8 km2, the Darlık Dam 5.7 km2 and the Alibey Dam 4.7 km2. These six drinking water dams have a total area of 118.2 km2.  The decline in the water level of a total of 118.2 km2 of dam area was taken into account. Considering that 10 per cent of the area is covered with solar panels and 15 decares of the area is used for a solar power plant ( MW ), there is a potential to build 788 MW solar power plants on the reservoirs in Istanbul. Taking into account that the panels will be placed parallel to the water surface and 8 decares of land will be used for the plant with 1 MW capacity, 1478 MW solar power plants can be installed in the same area. A pilot project is planned within this framework  The main objectives of this project can be listed as;  In this project, floatable pontoons will be made from materials that do not affect the ecosystem. A boat and floating dock will also be used for this construction work. The electricity generated will be transmitted to the ISKI distribution centre through the transformer to be installed. Simultaneous operation through the grid will also be ensured.  It is also planned to install a lightning protection system, an earthing system and a lighting system with LED lights at the construction site.  Monitoring studies are also being carried out as part of the floating solar power plant with photovoltaic panel capacity project. The following data will be collected as part of the data recording and remote monitoring system: Solar radiation (kw/m²), module temperature (ºC), ambient temperature (ºC), water temperature (ºC), water level (m), wind speed (m/s), total power generated in the photovoltaic panels (kW), total power fed into the grid, and daily, monthly, yearly and total energy measurements. At the same time, the monitoring system will work with a GPRS modem as part of monitoring studies and it is planned that it will be monitored on smartphones.    We also plan to monitor and report on the evaporation of the dams during the summer months to demonstrate that the system components meet the structural and functional requirements throughout their life cycle. As part of the analysis and reporting, the following equipment will be installed: Water Vapour Analyser, Anemometer, Dew Point Hygrometer, Psychometer, Net Radiometer Sensor, Soil Flow Plate, Precipitation Gauge, Temperature Sensor, Humidity Sensor and Atmometer to measure evaporative losses. It is planned to record phytoplankton count, chlorophyll, water temperature, chloride, bromide, chloroform, bromoform, total organic carbon, total Thm and UV absorption parameters when measuring water quality.  This study is designed to increase the sustainable use of FPV by addressing energy problems and to support FPV with the alternative energy sources it produces. environmental sustainability will ensure that issues are addressed, particularly in reducing emissions and air pollution, but also in protecting water resources and reducing vulnerability to climate change, as well as increasing underwater biodiversity, particularly in fossil fuel-based economic areas in transition Accordingly, the project is in full compliance with Sustainable Development Goals 7, 11 and 13 (SDG 7, SDG 11 and SDG 13) as it creates energy efficiency and an alternative energy source in FPVs and provides solutions to potential risks. This project focuses on the development and improvement of FPV technologies with reduced cost and improved technical performance and efficiency of FPV modular systems. Reducing evaporation with the use of renewable energy sources is of great importance as it will provide a sustainable solution to the problems related to both reducing water losses and energy consumption. |
| **Profiles of partners for carrying out the proposed activities** | **ODTÜ- GÜNAM -University**  **……………………………..**  **Zorlu Energy**  **…………………………….**  **Istanbul Water and Sewerage Administration (ISKI)**  Founded in 1981 with the launch of ISK Law No. 2560, ISKI is a public utility of Istanbul Metropolitan Municipality with an independent budget. The managerial board of the administration, where the Mayor of Istanbul is the Board Chairman, is the Metropolitan Municipality Council. The General Director of ISKI is elected upon the proposal of the Metropolitan Municipality Mayor and approved by the Minister of Interior Affairs. The General Director of ISKI also acts as the Vice Chair of the Management Board that also includes 4 members including a senior Deputy General Director. Two inspectors elected by the ISKI General Board (Municipal Assembly) conduct inspection services. The administration includes 5 Deputy General Director Offices, Department of Inspection Committee, Legal Advisor’s Office, Internal Auditing Unit, 20 Departments and 104 Directorates. A total of 9,905 staff includes 7,100 workers and 2,805 officers with a majority of technical background. To receive ISKI’s services, water and wastewater subscription is required through a contract with İSKİ. Water consumption is identified and measured via mechanical or smart meters. Contracts are classified according to the consumer groups of households, businesses, public institutions, industrial locations, village settlements and offices as well as municipal buildings. |