1. Introduction

Turkey is geographically situated in one of the earthquake regions of the earth. This situation is not only specific for Turkey, various countries have the same conditions. Occurrence of earthquakes are unpredictable and it is not possible to avoid from earthquakes. Then, the only way to mitigate the damages of an earthquake is to take precautions before it occurs. This point is especially important in the heavily populated areas; such as cities. In other words, people must be made ready to face the problems and to solve them as quickly as possible in such disasters. However earthquakes do not occur frequently; decades and some times centuries could pass after an earthquake to happen a new one. Therefore it is not possible and also not useful to keep people alert for an earthquake always. But it is also important to keep the feelings of people relaxed that in the occurrence of an earthquake there will be facilities to meet peoples’ demands.

Earthquake is a destructive disaster and the damages it causes take long times to remove. On the other hand, life must go on.

Taking all these opinions into consideration, Clean Energy Foundation (CEF) has developed a project to help solar energy to solve some problems that will be faced after an earthquake: Solar Earthquake Parks.

2. What is Solar Earthquake Park?

Solar Earthquake park project proposes, in the urban areas that are sensitive to earthquakes, such as villages, city districts etc. allocation of a existing park place or a new park place to be arranged as Solar Earthquake Park. This place could be an open air sporting area or a recreation park.

In this area an earthquake resistant building (steel construction), such as cafeteria or cafe or restaurant is proposed to be built. Existing buildings can also be modified to meet the desired situation. The suitable facade or roof of this building will be used to place solar collectors and solar PV panels. With necessary components (water tanks, invertors, pumps etc.) adapted to these panel arrays, two systems will be constructed: solar collector system provides hot water and PV panel system provides electricity.

The electricity obtained from PV solar cell system will be used to help to meet the electricity needs of the building in normal conditions; i.e. every day life. In an extraordinary condition, such as an earthquake, the solar electricity will not be effected and interruption in electricity of the building will not occur. As it is known that electricity is automatically cut immediately after an earthquake by the grid system for safety reasons. This causes serious problems especially if the earthquake occurred in night time. Thus, the solar electricity can be used reliably in these conditions.

In the Solar Earthquake project, it is proposed that, in extraordinary conditions the solar electricity can be used for:

a) ambient illumination,

b) charging mobile phones,

c) cooling a store room to keep medicines etc.

a) Ambient illumination is very important after a disaster, like earthquake. People can gather up in this illuminated area and can arrange some rescue procedures. They talk each other and get information. Their fear can be removed in some extent.
b) As communication is very important after a disaster like earthquake, presently mobile phones have undertaken a great role. As the mobile phones have to be charged at most in every 2-3 days, electricity needed for charging them. Solar electricity can thus give service for this purposes too. For this reason, a mobile phone charging center is proposed in the building for emergency cases to have multiple charging connections.

c) It is apparent that health issues will play a great role to keep people healthy and cure the wounded persons after the earthquake. In this respect medicine and vaccine should be kept in proper conditions. For this reason, within the building, a cold room (store room) is proposed to be cooled by the solar electricity.

The hot water obtained from solar collectors on the other hand, will be used for washing purposes in everyday life. These may include dish washing and cloth washing, and if the place has sporting fields such as tennis and basketball, hot water can also be used by the sport man for taking showers.

In extraordinary conditions, such as an earthquake, the solar hot water will be used for washing the clothes and dishes for sanitary purposes, and also will be used for showers as well. This issue becomes very important after such disasters, because the earthquake disasters do not cause one day inconveniences, but it takes long time to return to normal living conditions. In this period, to keep the people healthy is important and passes through the sanitary conditions.

3. The importance of the Solar Earthquake Park

The proposed project will function in ordinary conditions and also in extraordinary conditions, such as earthquake. There are some projects similar to the aim of the proposed project, however they are planned to be used only in the earthquake conditions and not in the ordinary conditions. As earthquakes occur in long intervals, the usage of these kind of implementations will not have a chance to be used efficiently. However, the project proposed by CEF has the advantage that the system is used in every condition without interruption.

On the other hand, as people will aware the existence of such a place, they feel comfortable even before an earthquake occurs and gives the belief that they can trust solar energy as a reliable energy source for everyday life and disaster occurring conditions also. It is also known that people suffered an earthquake will have the anxiety of “if it happens again what shall I do?” This anxiety may be removed by some extent by Solar Earthquake Park, because they can rely on solar energy as an uninterrupted energy source that will serve them.

4. Realisation of the Solar Earthquake Park project

CEF has the experience of implementation of such a project. In the 1999 earthquake disaster occurred in the northwest part of the Turkey, CEF realised a similar project within the area of the United Nations Tent-city (See the photos below). Unfortunately this implementation was realised after the earthquake occurred in this area. However CEF has learned its lessons from this application and now approaching the issue with more concrete comprehension.

The cost of such a system will differ considerably according to the experiences of the undertaking organisation. While CEF has these experiences, it estimates the cost as follows.

For the solar hot water system with 20 collectors : 15,000 US Dollars
For the 4kWp solar PV electricity system : 50,000 US Dollars

The prices given above may differ according to the situation taken into account. In these prices only the system implementation is considered and building construction is not taken into consideration because this situation may change place to place.

5. Conclusions

CEF has planned and made a prototype model and is going to offer this model to the municipalities. CEF has the belief that the prototype will have the chance to be implemented in 2004 and this will be an example and proliferation of these parks will take place in Turkey in different regions. Of course this project will draw the other countries’ interest and may have the chance to be implemented in these countries. CEF believes that this project will not only show the reliability of solar energy in disaster conditions, it will promote the solar energy usage as well.