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A Critical Approach to Geothermal Energy in Turkey in Terms of Sustainability and Health Tourism

Cengiz DEMİR¹

Özgür SARIBAŞ²

Abstract

The world is changing; it is slowly running out of resources. The change and the depletion of energy resources are being discussed all the time. The rapid development of sustainable tourism is constantly changing and shaping the concept of sustainability. Every country has its own way for this reshaping and some countries have chosen sustainable renewable and environmentally-friendly energy resources in this movement.

Due to its geographical position Turkey has advantage in using a wide range of renewable energy resources. This study is related to one of this green energy – geothermal energy (GE).

Turkey has a great potential regarding geothermal energy. Turkey is Europe's number one and the world's number seven country concerning its geothermal resources. The most significant geothermal systems are located in the western, central and eastern parts of Turkey. The first search for geothermal energy was launched in Turkey in the Aegean region. Geothermal energy is an important sustainable source and this energy is also important for health tourism. Health tourism is

¹ Prof.Dr.,Dean, İzmir Kâtip Çelebi University, Faculty of Tourism

² Res. Asst., İzmir Kâtip Çelebi University, Faculty of Tourism

developing in the world and Turkey wants to be a part of this movement. Izmir has an important role in health tourism and has a significant advantage in terms of thermal energy. Moreover, health tourism is in Izmir's program for the EXPO 2020.

The aim of study is to provide the information on the sources of thermal energy in the region and to evaluate the investments in this regard. Firstly the importance of geothermal energy potential is discussed and geothermal energy in Izmir is analyzed. After information of thermal energy sources in the region is collected and investments are examined, the connection of geothermal power with health tourism is evaluated.

Keywords: *Geothermal Energy (GE); Sustainability; Health Tourism*

JEL Codes: *L83, Q42*

1. Introduction

Based on a definition; heat extracted from the earth (www.iea.org; 01.03.2013). The sources of the heat are radioactive decay in the crust and mantle and heat from the core of the earth. Heat from shallow geothermal sources will include heat gained by the earth from direct sunlight and rain (Blodgett & Slack 2009). The technology of thermal energy storage has been developed to a point where it can have a significant effect on modern life. With the advent of the industrial revolution thermal energy storage introduction as a by-product of the energy production. A variety of the new techniques of thermal energy storage has become possible in the past (Ataer, 2006). Geothermal

energy was such an importance but this not limited to the importance of geothermal energy. Also there are many benefits of geothermal energy:

With a rapidly growing world-population, and ever increasing environmental concerns, sustainable development has become an issue of crucial importance for mankind. Geothermal resources have the potential of contributing significantly to sustainable energy use in many parts of the world (Axelsson, et al, 2005). Moreover, geothermal is a renewable energy source, has major benefits relative to fossil fuels with respect to global carbon dioxide emissions, and accordingly has significant potential for reducing global warming effects. Its use is mostly environmentally benign. However, there are some local environmental problems associated with geothermal utilization. To further the use of geothermal energy, it is important to identify possible adverse and beneficial environmental effects, and devise and adopt measures to avoid or minimize adverse impacts, while encouraging the benefits (IEA, 2012).

Due to the growing world population, the increasing life quality and rising cost of health care services; people tended to some countries in order to get better quality and relatively cheap service. Proportional increase in the elderly population has been one of the factors that increase health tourism as well (<http://investinwmr.org.tr>; 02.03.2013). And define health tourism as “the organised travel outside one’s local

environment for the maintenance, enhancement or restoration of an individual's well-being in mind and body" (Lunt, et al., 2012).

Geothermal energy has an important place in healthcare. Thermal tourism as a branch of health tourism provides benefits both for health and recreation and requires services and facilities for accommodation, catering and cures etc. Thermal Tourism is the usage of thermal waters for human health and recreation except for usage of thermal waters for bath. Thermal tourism or thermal springs and baths play an important part in health tourism which combines various fields and methods for health treatment such as mineralized thermal water bath, drinking and inhalation sources, mud baths and the complimentary therapies like climate cure, physiotherapy, rehabilitation, mecanotherapy, exercise, psychotherapy and diet (Oguz, at al., 2010).

Geothermal sources can be used both for producing green energy and for health tourism particularly thermal tourism treatments. In addition geothermal energy has different ability to:

- provide reliable electricity at a stable price;
- help states diversify the mix of fuels they use to produce electricity;
- generate electricity in a manner that produces minimal environmental impacts and emissions;
- help states meet renewable portfolio standards;
- generate economic development opportunities, especially in rural areas;
- provide heat for agricultural, industrial and space heating applications.

(www.geocollaborative.org; 02.03.2013)

There is a big variety of renewable sources of energy in the world as hydro, solar, wind, biofuels, wave & tidal energies. In the table 1, a short description of these alternative types of energy is given.

Table 1.Renewable Energy Comparison Chart

	Types	Economic	Environmental Impact	Key Characteristics
Hydro	Dams	Extremely competitive when suitable water is available; by far the most widely used renewable energy	Building dams alters hydrology resulting in population displacement and environmental costs.	Provides dependable baseline power
Solar	Photovoltaic, Solar Thermal	High start-up costs, then virtually free	Could occupy large land area	Intermittent; solar thermal may provide baseline power
Wind	Turbines	High start-up costs, then	May harm birds and bats. Visual	Intermittent only

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		virtually free	impact.	
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Biofuels	Ethanol, Biodiesel, Algal, Biomass	Continuing costs to produce	Takes energy input to create. Displaces land that can be used for food or wilderness.	Used primarily for transportation; Biomass may provide electricity
Geothermal	Heat Pumps, Plants, EGS (experimental only)	Extremely high start-up costs, then virtually free.		Provides baseline power.
Wave & Tidal	Hydraulic ram Turbine generator	High initial cost. Only beginning development.	Can disrupt fishing grounds and navigation	Still experimental. Intermittent (but more predictable than wind)

(Goffman, 2009)

Types and characteristics of some energy sources are given in the Table 1. While all alternative energy sources should be considered, compared to solar, wind, and biofuels, geothermal has been overlooked in much of the media. Although geothermal technology is well developed, its potential has barely been tapped. With an accelerating global environmental crisis, with fossil fuels increasingly difficult to find

and extract, clean, natural, geothermal and other renewable energy sources are undergoing intensive research and development to solve our environmental problems and provide our energy needs (Goffman, 2009)

2. Literature Review

Many countries take advantage of geothermal energy and one of these countries Turkey. Turkey is aware of the importance of geothermal energy, Turkey is among at the same time it has a significant potential. In addition to above information, Turkey emphasizes the importance of the relations of geothermal energy with health tourism. Hot water is produced during geothermal activity. This water can be used in thermal plants and for health tourism. There are several branches in health tourism and one of these branches is thermal tourism. Turkey boasts of a great variety of thermal tourism destinations:

- Thermal Tourism Cities in South Marmara Region (Çanakkale, Balıkesir, Yalova)
 - Thermal Tourism Cities in Phrygia (Afyon, Kutahya, Istanbul, Eskisehir, Ankara, Turkey)
 - Thermal Tourism Cities in South Aegean (Izmir, Manisa, Aydin, Denizli, Turkey)
 - Thermal Tourism Cities in Central Anatolia (Yozgat, Kırşehir, Nevşehir, Niğde)
- (Ozberk & Ozberk, 2009)
- Thermal Tourism Cities of the North Anatolian Region: Amasya, Sivas, Tokat, Erzincan

- Thermal Tourism Cities of the Eastern Marmara Region: Bilecik, Kocaeli
- Thermal Tourism Cities of the Western Black Sea Region: Bolu, Düzce, Sakarya

(<http://www.saglikturizmi.gov.tr>; 03.03.2013)

Increased demand, especially on the 22 new thermal hotels was built between 2007 2010. 46 provinces, 240 Hot Springs was the number of plants. Bed capacity was raised to 17,767 from to the 29,727. Turkey wants to visitors from the sea-sand-sun triangle of Turkey; health tourism in the country to become a center of attraction is a variety of investments. Turkey Tourism Strategy 2023 and Action Plan 2007-2013 4 for thermal tourism within the region was created. 68 investors in the tourism center of tourism demand are expected (Aydın, 2012).

One of the important thermal tourism destination is İzmir in Turkey. Especially Balçova region of Izmir has a big potential for thermal source and plants. Not only does Balçova but also Seferihisar, Dikili, Çesme, Urla, Gülbahçe (Yanardağ & Yanardağ, 2009) regions have potential for thermal sources. Izmir wants to be one of the leading cities in the field of thermal tourism and this is an indication of the importance given to health tourism. EXPO 2020 with health-themed in Izmir is going.

Featured Countries in Medical Tourism



1. India
2. Thailand
3. Singapore
4. USA
5. Malaysia
6. Germany
7. Mexico
8. South Africa
9. Brazil
10. Costa Rica

(Acar, et al., 2012)

Health tourism grew quickly and in 2007, more than 1.3 million foreign patients visited Thailand to receive care India earned 480 million (2005), Singapore earned 1.2 billion (2007), Malaysia earned 90 million

(2008) from medical tourism (Blouin, 2013). The health tourism market is currently thriving in Singapore, Malaysia and Thailand (Banu, 2012). All these countries have their own major services. Each country has a different profession and provides different benefits. There are distinctive features of health tourism as income and demographic structure of the participants that can be used for 4 seasons and it has much more positive benefits. Health tourism will continue to evolve as long as human beings exist. There are various branches of health tourism in Turkey. This study indicates that thermal tourism is the part of health tourism.

Table 2. Bed Capacity of Thermal Tourism in Turkey

Type-Class	Tourism Investment Certificate		Tourism Management Certificate		Total	
	Number of Plants	Number of Beds	Number of Plants	Number of Beds	Number of Plants	Number of Beds
Thermal Plants	18	8.454	63	19.212	81	27.666
Other Plants	1.176	254.245	2.264	422.542	3.440	676.796
Overall Turkey	1.194	262.708	2.327	441.754	3.521	704.462

<http://www.saglikturizmi.gov.tr>; 03.03.2013

Turkey wants to increase these capacities and it has new targets for 2023 Tourism Strategy. Thermal tourism master plan will be prepared as a priority for four regions:

South Marmara: Balıkesir, Canakkale and Yalova

South Aegean: Aydın, Denizli, Manisa, İzmir

Phrygia: Afyon, Ankara, Istanbul, Eskisehir, Kutahya

Central Anatolia: Aksaray, Kırşehir, Nigde, Nevşehir, Yozgat

Thermal tourism centers in these areas will be determined and will be incorporated into strategies for the development of thermal tourism infrastructure and superstructure (Tourism Strategy of 2023). This will also open more opportunities for economic development. As the demand for clean energy grows, jobs in geothermal energy will be a small but growing potential source of new employment opportunities (Liming, 2012).

Turkey has a great potential thanks to geographical location and wants to support this advantage with new strategies and investments. In this study the potential for geothermal energy in Turkey has been given from different resources and the importance of geothermal energy particularly in Izmir and its thermal energy potential was emphasized. Izmir is currently not using all the potential of thermal energy. If it supports new investment Izmir can be one of the most important cities in the world for thermal tourism.

3. Results and Discussion

Abundant geothermal resources throughout the nation can provide an environmentally friendly source of energy. Data compiled from a variety of sources point to geothermal energy as an environmental option for new power generation that is far better than other energy sources such

as fossil fuels. In addition, geothermal remains as environmentally friendly as most other renewable sources, while simultaneously offering reliability and a source of baseload power that is unique among most other renewable options available (Kagel, et al., 2007). All this shows that geothermal energy has a great importance for the environment, sustainability, renewability and health treatment in thermal baths etc. It is important to remember this and support its development with investment.

Treatments with thermal waters have always been a common method in Anatolia. Turkey is located on a major geothermal zone. There are over 1,000 thermal springs with mineral-rich content in Turkey. Turkey is in 7th place in terms of thermal resources in the World. Turkey receives about 1.5 million visitors from abroad in thermal treatment facilities. Due to the 2% increasing of world population ageing per year, thermal tourism becomes more reasonable and more reliable for investments. Thermal tourism attracts mostly elder people which can be considered a great advantage in terms of geopolitical position. If Turkey spends more time and money on thermal tourism facilities and investments, it can be the most popular destination for Middle East Countries and European Countries (<http://investinwmr.org.tr>; 02.03.2013)

The main theme of this study is geothermal resources benefits and its usage both for energy production and thermal health treatment in Turkey particularly in the Aegean region. İzmir province understands its

importance and took significant steps into thermal energy and health tourism development, investment. Izmir supports the sustainable development of its city and continues its environmentally-friendly trend in the provincial health-themed EXPO 2020.

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