

# Chapter 11

## Investment on Heat Pumps: Geothermal Green Solutions for Turkey Lowering Energy Costs

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### ABSTRACT

*Recent scientific researches show that human influence on climate change due to the use of conventional energy is continuously affecting the world. By all means, conventional energy sources destruct the earth, living standards of environment, and health leading to unnecessary risks and high costs. Therefore, nations focus to find new solutions of renewable energy sources which are clean, healthful, smart, and affordable. This chapter explores one of the new forms of smart energy management systems for heating called “heat pump” and its development in Turkey. Heat pumps offer smart heating solutions for buildings that lower the imported energy costs in the economies. The study shows that as Turkey facing severe financial burdens, major factors still act against the progress of renewable energy investments and energy efficiency solutions. However, efforts to improve energy saving investments like heat pumps could be promising for cheap and smart energy source, if only Turkey sticks to a sound action plan developing public awareness and education.*

### INTRODUCTION

Energy is a hot issue central to social and economic well-being. Yet, it is assumed that more than 1 billion people have no access to electricity, while over 3 billion people have to cook with polluting, *inefficient fuels such as firewood*. Besides, energy is unfortunately the dominant contributor to climate change. (United Nations Sustainable Energy for All Forum, 2017).

In 1992, at the Rio Earth Summit 184 countries pronounced their commitment to sustainable development (Euromotor). Many countries are already adopting efficient energy technologies and practices since 1994 (United Nations, 2017). The challenge of increasing the rate of improvement in energy efficiency is significant but achievable. The opportunities are greater still, mainly focusing economic growth and a cleaner planet (Sustainable Energy for All, 2014).

DOI: 10.4018/978-1-5225-5757-9.ch011

## Investment on Heat Pumps

Acting according to the United Nations Framework Convention on Climate Change and mainly the Kyoto Protocol, cities benefit from becoming smart cities through energy service company (ESCO) model as energy consumption decrease to a great extent but creating a safer and more comfortable environment for the people (Andretta, 2014). The integrated goals of energy security and poverty alleviation are inextricably linked with the need to reduce harmful air pollution and address climate change (Okay, 2016).

A city with a green economy is by building creative industries and services sector to capitalize on a world economy that is becoming increasingly ‘weightless’ – with a focus on generating high-value, low-carbon products and services, taking advantage of opportunities for innovation and job creation while transitioning to a lower-carbon city, such as through retrofitting homes and offices and trying new solutions to comply with green building standards and partnering on global solutions in the area of renewable energy and sustainable urban development nationally and overseas. However, being ‘green’ will require us to incorporate environmental values into all areas of economic activity. Businesses – in line with the city as a whole – will need to be sustainable in their use of natural resources such as energy and water, and to minimize or if possible eliminate waste (Wellington2040).

Under the programme that was put into action in 2012 to diagnose Green Economy In Action (United Nations 2012) United Nations is leading a forum named as Sustainable Energy for All. The three objectives of the Forum firstly announced in 2015, are for improving energy efficiency that has the clearest impact on *saving money*, improving business results, and delivering more services for consumers—better refrigerators that cost the same but use less energy; new vehicle designs that travel further on less fuel; and *buildings that require less energy to heat and cool* (Sustainable Energy for All, 2017).

Furthermore, natural sources of energy in creative ways (solar, wind, hydro, biomass, biofuel and geothermal) is cheap and clean for protecting environment and acquiring sustainable clean cities. In the last decade, energy shortages grew fast as global demand increases enormously (Renewable Energy Policy Network for 21st Century, 2017). Understanding the benefits of natural energy sources, countries are forced to work on legislature to provide incentives for renewable energy. The cost of renewable energy derived from nature is decreasing continuously as countries ambitiously adopted national strategic targets like providing energy efficiency enhanced (Okay, 2016) by the implementations of ESCOs all around the World (Okay, Akman, Okay, 2008).

At the same time, the World Health Organization declared key facts about indoor air pollution, much of which is associated with *heating* and unhealthy cooking practices:

- Around 3 billion people cook and heat their homes using open fires and simple stoves burning biomass (wood, animal dung and crop waste) and coal.
- Over 4 million people die prematurely from illness attributable to the household air pollution from cooking with solid fuels.
- More than 50% of premature deaths among children under 5 are due to pneumonia caused by particulate matter (soot) inhaled from household air pollution.
- 3.8 million premature deaths annually from noncommunicable diseases including stroke, ischaemic heart disease, chronic obstructive pulmonary disease (COPD) and lung cancer are attributed to exposure to household air pollution (World Health Organization, 2014).

This study has five main objectives. The first objective is to emphasize the global concerns and importance of green economy, and smart city planning with natural renewable energy sources protecting ecology and lowering costs. In this context, global economies’ energy strategy and carbon mitigation

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