

THE INFLUENCE OF ENERGY POLICY INSTRUMENTS UPON THE PROMOTION OF SOLAR THERMAL TECHNOLOGY IN GREECE

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Keywords: Energy policy in Greece, Solar Thermal Technology, Energy efficiency

1. Introduction

Renewable Energy Directive (EU) 2018/2001 on the “Promotion of the use of energy from Renewable Sources” establishes a binding EU target for the share of energy from Renewables Energy Sources (RES) in the Union’s gross final energy consumption for 2030 of at least 32%. In this Directive, Member States are expected to develop proper supporting mechanisms to promote the use of Solar Thermal (ST) energy for achieving this target.

In Greece, ST technology is a renewable source with high potential in terms of energy savings and cost effectiveness. The total ST installed capacity in operation in 2017, for low and medium temperature applications, is 3.2 GW_{th}, corresponding to 4,618,000 m² of solar collective area [1]. As shown in Figure 1, Greece is ranked at the third place in EU27 in both terms - total ST capacity in operation in 2017 and total capacity per capita - revealing its well-established ST market. The data for the year 2017, are elaborated according to the methodology as presented by Oikonomou Th. [2]. However, the vast majority of installed systems in Greece are the simplest, yet very efficient, type of the technology thus the thermosiphon system for domestic hot water production. The effective expansion of ST technology use in more complex systems for heating and cooling, as well as for other applications such as Solar Heat Industrial Processes (SHIP) and electricity production, requires effective implementation of proper national policy instruments.

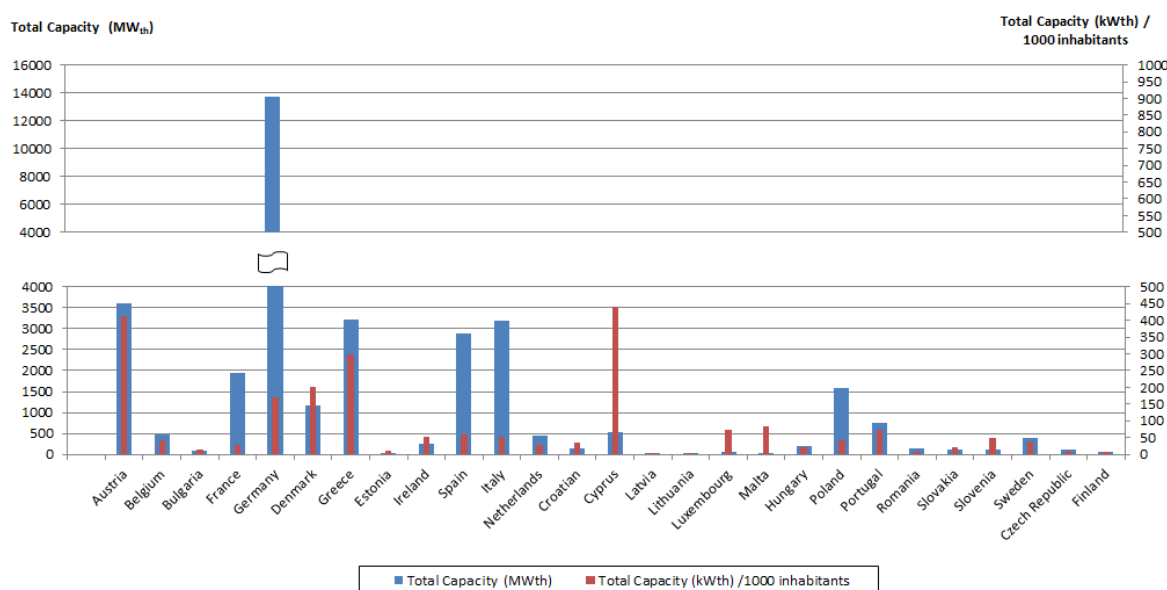


Figure 1: Total ST capacity in operation in 2017 and total capacity per capita in EU27

2. Background

The Greek policy instruments for ST market deployment are limited and mostly addressed to RES technologies and not directly to ST systems. They include proper regulatory framework, incentives and funding opportunities aiming at improving energy efficiency meeting the targets set by EU and thus promoting sustainable energy behaviour.

Regulatory framework includes measures for mandatory installation of ST systems in new residential buildings [Law 3851/2010, Article 10] as well as in tertiary sector buildings [M.D. D6/B/oik.5825/09.04.2010, Article 8]. The minimum percentage of solar share on yearly basis is set at 60%. Law 4342/2015 examine the energy efficiency in buildings and includes articles providing incentives for installing ST systems. In Article 6, ST technology is included in the technologies for improving energy efficiency. Article 7 states that the "Heads of Regions and Mayors" must set energy efficiency plans for public buildings including the installation of ST system. Article 9 establishes "Energy Efficiency Obligation Schemes", where the required energy saving targets may be achieved by ST installations. Article 10 imposes large enterprises to perform energy audits and implementing interventions including ST installations. Law 3855/2010 sets, as mandatory, the gradual installation of central ST systems or other RES technologies in existing and new central and general government buildings [Article 8]. Regarding electricity production by RES, Laws 3468/2006 and 3851/2010, establish the needed procedures for installing concentrating ST plants in Greece.

Greek Government also supports a more market-oriented financial support scheme. To this aspect, it has established an “Infrastructure Fund” aiming at maximizing the use of financial instruments, in the field of energy saving and promotion of RES. Another indirect funding mechanism is “Greek Development Law 4399/2016”, which aims at encouraging investments, mainly in the field of manufacturing and energy, covering up to 55% of eligible costs. There are also direct funding programmes in which ST systems are applicable. Such programmes are the “Saving – Autonomy”, “Improving the Energy Efficiency of SMS Enterprises”, and “Modern Processing programme”.

3. Methodology

The aim of this study is to provide specific policy recommendations on how to promote ST energy in Greece. In order to achieve this objective, past and ongoing policy strategies were identified and their success were assessed. Moreover, this study examined the barriers that prevent the dissemination of ST systems and provides recommendations for overcoming them.

Furthermore, best practices currently applied in other EU countries were studied and the most suitable ones were selected to be applied in Greece. The behavioural, policy and other interventions to promote ST systems in other EU countries with high ST penetration, ranked in high place in Figure 1 – such as Germany, Austria and Cyprus - , were studied for the needs of this study [3, 4, 5, 6].

This work resulted in a number of suggestions for interventions suitable for Greece, as given in the discussion section.

4. Results and Discussions

This study presents the energy policy instruments upon the exploitation of ST technology in Greece, aiming at promoting sustainable energy behaviour and achieving energy efficiency. It also focuses on tracking down and gathering the existing Greek policy instruments in energy sector, which are specifically applicable to ST technology.

In Greece, there are already certain policy instruments related to ST technology, which are expected to contribute to the promotion of sustainable energy behaviour. However, further actions should take place for the exploitation of ST sector potentials.

The Greek ST market, for low and medium temperature applications, is well-established across EU 27. This is the result of policy instruments for the development of the national ST market, established in the early 1980s, including successful marketing campaigns and fiscal incentives, such as low-interest loans and tax credits (VAT exception).

For complex ST systems, such as SHIP, the banking sector in Greece is cautious in approving private funding for energy efficiency investments. The main reason is the lack of personnel

knowledge resulting in considering such systems, as a risky investment. This leads to high interest rates regarding business loans. To overcome this, personnel knowledge should be enhanced and interest rates could be subsidised.

For promoting the ST systems in Greece, the following guidelines are suggested:

- The national energy targets, foreseen in the Greek National Energy and Climate Plans, should be realized by specific policy measures including ST systems. This should include, the implementation of competitive tendering programs, aiming at facilitating the take-up of energy efficient technologies, such as ST systems.
- Best ST practices in other countries should be studied and adopted in Greece. The effectiveness of ST applications should be disseminated, using proper tools, such as leaflets, workshops and seminars.
- More financial support programs, addressed directly to ST systems for heating and cooling, SHIP and ST electricity production, should be applied.
- Implementation of market-oriented financial support schemes, including subsidy measures (tax credits and exemptions, preferential interest rates , etc.) to prospective investors proving energy saving potential, achieved by ST installations.
- Deployment of Greek legislative framework – concerning the conduction of energy audits and the mandatory energy efficiency interventions including ST systems – not only to large but to all size enterprises.
- Investigating and establishing policy instruments, tackling Energy Poverty in Greece, in order to achieve economic and social cohesion. The policy instruments will include measures for the deployment of ST sector.
- Supporting of pilot actions under a specific market strategy that would foresee and anticipate the replication of ST interventions.

Acknowledgement

This work is implemented in the framework of the European H2020 project INSHIP, GA731287.

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