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Energy Policy 33 (2005) 2361–2373

ENERGY POLICY

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# Assessing of energy policies based on Turkish agriculture: current status and some implications

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Available online 2 July 2004

**Abstract**

In this study, the current energy status of Turkey and the effects of national energy policies on Turkish agricultural support policies are discussed for both current and future requirements. Turkey is an energy-importing country producing 30 mtoe (million tons of oil equivalent) energy but consuming 80 mtoe. The energy import ratio of Turkey is 65–70% and the majority of this import is based on petroleum and natural gas. Furthermore, while world energy demand increases by 1.8% annually, Turkey's energy demand increases by about 8%. Although energy consumption in agriculture is much lower than the other sectors in Turkey, energy use as both input and output of agricultural sector is a very important issue due to its large agricultural potential and rural area. Total agricultural land area is 27.8 million hectares and about 66.5% of this area is devoted for cereal production. On the other hand, Turkey has over 4 million agricultural farm holdings of which 70–75% is engaged in cereal production. Machinery expenses, mainly diesel, constitute 30–50% of total variable expenses in cereal production costs. It is observed that energy policies pursued in agriculture have been directly affected by diesel prices in Turkey. Therefore, support policy tools for using diesel and electricity in agriculture are being pursued by the Turkish government.


*Keywords:* Energy policy; Agricultural policy; Energy usage; Turkey

## 1. Introduction

Energy is needed for almost every stage of modern life and accessing appropriate energy has gained more attention for both producers and consumers. In addition, the energy consumption level is used as the criteria to indicate the development level of the countries. The level of energy dependency and the quantity of energy consumption in many developed countries are higher than developing countries. However, energy demand is growing sharply in developing countries in order to fulfill the requirement for modern technology. The majority of energy consumption is based on fossil energy sources. To utilize energy from renewable sources is not enough to meet world-wide energy demand. For this reason there is a requirement for management of limited fossil energy sources using international energy policies. National energy policies may also change in the context of global energy policies. Moreover, the impacts of national energy policies on sectors are different. These different effects on national economic sectors should be considered by determining and implementing the national energy policies.

In the literature, there has been a considerable amount of research carried out focusing on general energy policies and energy use in agriculture. However, little attention has been paid to rural and agricultural energy policies. It is well known that agriculture has a dual role, with respect to the energy user and supplier. These characteristics can play a very important role in terms of reducing environmental emissions. On the other hand, Turkey is an agriculture-based country. The number of farms was 3.1 million in 1963 and it reached

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doi:10.1016/j.enpol.2004.05.005

4.1 million in 1991. Agriculture is still Turkey's largest employment provider and a significant contributing sector to gross domestic product (GDP), imports and exports. The share of agriculture in GDP at current prices was 14.1% in the year 2000. The contribution of agricultural commodities in total exports was 10.6% and more than 40% of the total population was engaged in agriculture (Ozkan et al., 2004).

The main objectives of this paper are to assess how the Turkish agricultural sector was affected by the energy policy at all levels, to discuss developments of energy issues at the global level and present status of Turkey, to highlight the relationship between energy and agriculture and to review energy polices and new approaches in the context of national energy policies pursued in agricultural support polices.

## 2. Overview of energy supply and consumption in the world

Energy supply and consumption are the major economic factors in the world, while the dynamics of energy markets are driven by supply and demand equivalence. Total primary energy supply (TPES) of the world was 10 038 mtoe (million tones of oil equivalent) in 2001. The shares of oil, natural gas and nuclear energy in TPES are 35%, 21.2% and 6.9%, while renewable energy supply accounts for only 13.5% of TPES (Fig. 1) (IEA, 2002, 2003a). The solid biomass is the largest renewable energy source, accounting 10.4% of the world TPES (Fig. 1), or 77.4% of global renewable energy supply (Fig. 2) (IEA, 2003a).

Based on the country groups, OECD has the highest proportion (53.2%) of TPES in 2001 followed by Asia (11.5%) and China (11.5%) (Fig. 3) (IEA, 2003b). Half of the total renewable energy supply is provided from Africa. Asia (33.3%), Latin America (27.9%) and (20.8%) China are other important world renewable energy suppliers (Fig. 3) (IEA, 2003a). Most of the renewable energy supply is provided from combustible renewable and waste (CRW) (79.9%) in the world (Table 1) (IEA, 2003a).

While annual average growth rate of world total energy supply was 1.4% from 1990 to 2001, renewable energy sources have more growth rate of 1.7%. Despite the amount of production, the most significant growth rate (19.1%) has occurred for solar, wind and tide (IEA, 2003a). However, fuel energy proportion of TPES is not expected to change in the near future (IEA, 2003b).

World total final consumption (TFC) was 6 995 mtoe in 2001 and OECD countries consume more than half of the energy sources. The fuel share in TFC consists of oil (43%), gas (16.3%), electricity (15.6%), CRW (14.2%) and coal (7.4%) (IEA, 2003b). The fuel consumption is more different in developing countries than developed ones. For example, Africa has the highest biomass share (60%) in TFC. However, the shares of biomass are 34% and 25% in Asia and Latin America, respectively (FAO, 2000). Household consumption accounts for 68% of total energy consumption in African countries. Industry, transportation and agriculture are relatively small energy users. This energy pattern is similar to the majority of the other developing countries. Average household energy demand in developed countries is around 40% of total energy usage followed by industry

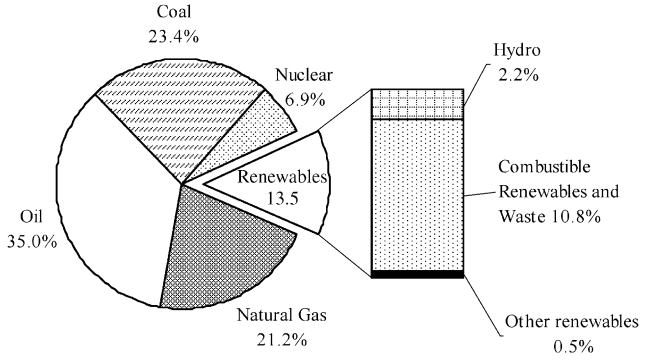


Fig. 1. Products' shares in the world total energy supply in 2001 (IEA, 2002, 2003a).

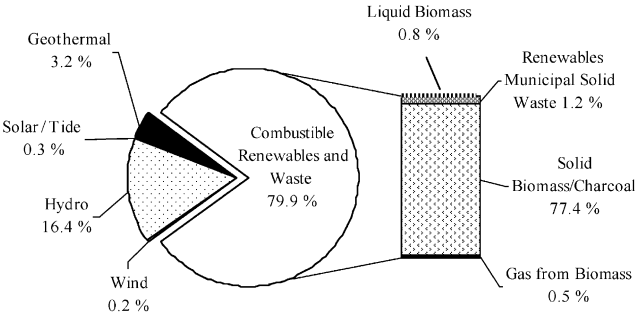


Fig. 2. Products' shares in the world renewable energy supply in 2001 (IEA, 2003a).

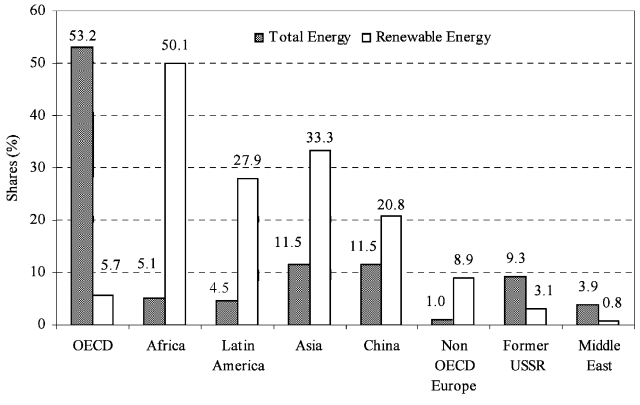


Fig. 3. The supply shares of total primary energy and renewable energy in the world regions in 2001 (Adopted from (IEA, 2003a, b)).