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Energy efficiency trends and policy in Slovenia

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ABSTRACT

The energy dependency of Slovenia is high (52.1%), but it is a little lower than the average energy dependency in the EU 27 (53.8%). Slovenia imports all its petroleum products and natural gas and partly coal and electricity. The energy intensity of Slovenia is higher by about 50% than the average in the EU 27. The target of the EU Directive on energy end-use efficiency and energy services adopted in 2006 is to achieve a 9% improvement of EE (energy efficiency) within the period 2008–2016. The new target of the EU climate and energy package "20-20-20 plan" is a 20% increase in EE by 2020. Since 1991 the Slovenian government has been supporting energy efficiency activities. The improvement of EE was one of the targets of strategic energy documents ReSROE (Resolution on the Strategy of Use and Supply of Energy in Slovenia from 1996 and ReNEP (Resolution on the National Energy Programme) from 2004 adopted by the Slovenian National Assembly (Parliament) in previous years. The Energy Act adopted in 1999 defines the objective of energy policy as giving priority to EE and utilization of renewable energy sources. The goals of the "National Energy Action Plan 2008–2016 (NEEAP)" adopted by the Slovenian government in 2008 include a set of energy efficiency improvement instruments in the residential, industrial, transport and tertiary sectors. The target of the NEEAP is to save final energy in the 2008–2016 period, amounting to at least 4261 GWh or 9% of baseline consumption. The indicators of energy efficiency trends show considerable improvement in the period from 1998 to 2007. The improvement of EE was reached in all sectors: manufacturing, transport and households. The paper analyses the structure, trends of energy consumption and energy efficiency indicators by sectors of economic activity. A review of energy efficiency policy and measures is described in the paper.

1. Introduction

Improvement of EE (energy efficiency) is one of the more important objectives of energy policy and strategy in all developed countries. The increase of energy dependency (the share of imported energy in the energy supply) and climate change present big challenges for all EU members.

The energy dependency of Slovenia is high (52.1%), but it is lower than in several EU members and slightly lower than the average of EU 27 (53.8%) as shown in Fig. 1.

EE is one of the most potent and cost effective ways of meeting the demands of sustainable development and lower fossil fuel dependency. Improvements in EE can be achieved either by decreasing total energy use or by increasing the production rate per unit of energy consumed Resolution on the National Energy Programme [1,2]. Improvements of the EE represent the main tools of energy policy to improve the competitiveness of the economy, security of supply, and environmental protection [3,4].

Some authors [5–7] have developed linked theses related to the role of energy in economic development, and potential sources for increased EE for continued growth with reduced GHG (greenhouse gas) emissions.

The efficient use of energy and intensities are important issues affecting energy systems and defining sustainability trends [8]. Efficient end use of energy as way to reduce quantities of energy consumed, without sacrificing socio-economic growth, translated into progress towards sustainable development [8].

The EE of technology is a way to reduce energy consumption without change of services or in consumer's behaviour and lifestyle.

The energy taxes and regulation are feasible solutions to reduction of energy consumption, when the improving of EE of technology is an ineffective way to reduce consumption [5].

It is also expected, that some of the savings from efficiency improvements will be taken in the form of higher energy consumption—the so called 'rebound' effect [9]. Analysis, explanation and critique of rebound effect has been the subject of various articles of several authors [5,6,10,11]. The rise of additional energy

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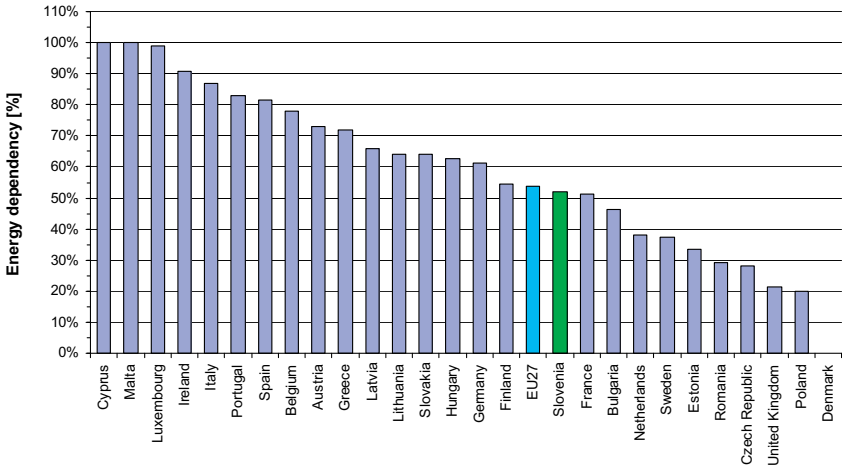

Fig. 1. The energy dependency of EU member countries in 2006. Source: Eurostat

consumption enabled by energy efficiency increases (rebound) has negative impact on energy efficiency policy and can become ineffective [6].

An IEA (International energy agency) analysis of their member countries found that the 28 member countries are engaged in promoting innovative financial instruments, energy efficiency strategies and action plans [4,12]. The governments of IEA member countries are increasingly turning to energy efficiency measures to meet GHG (greenhouse gas) mitigation, energy security and economic development goals. They are designing policies to promote EE in buildings, the adoption of standby power, the phasing out of inefficient lighting, correct tyre-inflation and related policies, and EE in utilities [4,12].

The main objectives of EU energy policy are sustainability, competitiveness and security/reliability of supply [13]. To achieve the goals of energy and climate policy, the EU adopted different directives regarding the efficient use of energy, increasing utilization of renewable energy sources and reduction of GHG emissions.

In 2006, the EU adopted the Directive on energy end-use efficiency and energy services [14] to achieve a 9% improvement of EE within the period 2008–2016. The EU members should adopt the EEAP (Energy Efficiency Action Plans) to achieve the target of the Directive.

The last document adopted by the EU is the climate and energy package "20-20-20" to 2020 [15]. The targets of the EU climate and energy package "20-20-20 plan" are to reduce GHG emissions by 20%, to increase the share of renewables in energy consumption and to improve EE by 20%, all of it by 2020.

Slovenia also ratified the Kyoto Protocol [16] to the United Nations Framework Convention on Climate Change and thereby undertook an obligation to reduce its CO_2 emissions by 8% by 2010, regarding the base year 1986 (for other countries 1990). The action programme for reducing GHG emissions was adopted by the Government in July 2003 [17,18]. Intensive utilization of the savings potential is one of major instruments to achieve the Kyoto target.

For monitoring, evaluation and for cross-country comparison, different sets of energy efficiency indicators have been developed by the IEA[1] and in the Odyssee project [19,20]. Many studies in previous years have tried to analyse energy efficiency trends and progress at the level of countries for the whole economy (including all sectors) [2,4,19,21–25] or by sectors [1,26].

Energy efficiency indicators provide information to policymakers and aid in the design of focused energy efficiency policies and measures and can be used to monitor the progress or impact of energy efficiency initiatives [27].

Different energy efficiency indicators for monitoring of the energy efficiency progress on a sectoral or sub-sectoral level [28] are developed.

To research the impact of structure changes on EE or energy intensity, a decomposition method is used especially for industry [1,28]. A general survey of decomposition studies has been done by [29], which explained and classified decomposition methods.

The main objective of this paper is to analyse the energy efficiency policy in Slovenia in previous years and how it represents the trends of EE using Odyssee indicators. The trends reflect the impact of the implementation of energy efficiency policy (measures), technology improvement and voluntary improvement of EE by sector.

2. Structure of the energy supply in Slovenia

The Slovenian economy was characterised at the beginning of its existence in 1990 by relatively high-energy consumption. The GDP

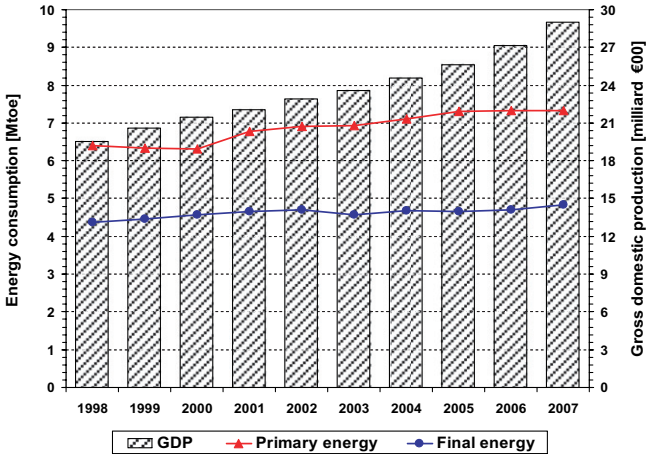

Fig. 2. Energy consumption and GDP (gross domestic product) in Slovenia. Source: Statistical Office of the Republic of Slovenia

[1] The International energy agency (IEA) has since 1997 developed a series of energy indicators to study energy-use developments and analyse factors behind changes in energy use and CO_2 emissions. Energy indicators (and the underlying databases) reveal key relationships between energy use, energy prices and economic activity.