# ENERGY CONSUMPTION AND ENERGY INTENSITY TRENDS IN TRANSITION AND DEVELOPED ECONOMIES

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*The article analyses energy efficiency and energy consumption trends in Lithuania in terms of sustainable development and aims to assess these trends in developed and transition economies. The results of development achieved by EU-15 and other developed countries indicate that the goals of sustainable development such as prosperity, high rates of economic development and low impact on the environment are not conflicting and can be achieved together. Transition economies newly entered the EU and suffering from a high resource intensity of economics and a comparatively low income per capita can converge in terms of the main indicators with EU-15 up to 2020.*

## Introduction

In terms of problems arising in the implementation of sustainable development, three groups of countries should be distinguished: developed, developing and transition countries. For developing countries the main problems are rapid growth of population, low income, poverty, income and gender inequality, education, medical services and health issues. For developed countries the main problems are excessive consumption of natural resources and environmental problems. For transition countries the main problems are resource and pollution intensive economies because of obsolete technologies, and low income. Therefore for analysis of sustainable development issues the main focus should be concentrated on eco-effectiveness indicators, such as energy and resource consumption per GDP, emission of pollutants per unit of TPES and unit of GDP. Another important issue is an active policy debate within the transition countries themselves as to whether total energy use should grow as the GDP grows. Presently these countries have a lower level of energy efficiency (higher intensity) than the current EU member states. If the convergence is fast enough, and if the growth is modest, there may be no increase in total energy use. In that case a target of non-increasing energy may be feasible and desirable as part of the sustainability strategy. If, on the other hand, the convergence is slow and the growth rapid, it will not be feasible to set a target of this kind.

In general, the concept of sustainable development merges two urgent goals (Daly, 1990 and 1991): a) to ensure appropriate, secure, wealthy life for all people – it is the goal of the development, and b) to live and work in accordance with bio-physical limits of the environment – it is the goal of sustainability. These goals might seem contradictory, but some relative data on environmental quality, natural resources utilisation and GDP per capita allow a presumption that environmental quality improves and income inequality diminishes with an increase of income per capita. This interrelation between the GDP per capita and the concentration level of anthropogenic pollutants is called the environmental Kuznets curve, analogous to the traditional curve proposed by Simon Kuznets, which demonstrates a similar relationship between actual income per person and income inequality (Ekins, 1997). A similar relationship might be applied for energy consumption per capita and GDP per capita, because energy-related processes are the main sources of anthropogenic emissions. In general, all these relationships prove that social, economic, environmental targets of sustainable development can be achieved together.

The aim of the article is to compare energy consumption per capita and energy intensity development trends in transition and developed countries, seeking to evaluate these trends in terms of sustainability. The following tasks were formulated to achieve the aim of the paper:

- to investigate energy consumption trends in Lithuania, EU-15 and other transition economies
- to investigate energy intensity trends in Lithuania, EU and some transition economies
- to assess these trends in terms of sustainability and to develop a forecast on the convergence of these indicators between developed and transition countries.

## 1. Energy consumption

A comparison of total primary energy supply (TPES) per capita in Lithuania and in 8 EU

*Table 1. Primary energy supply per capita in Lithuania, some EU member states and EU accession countries, toe/cap*

| | *1990* | *1991* | *1992* | *1993* | *1994* | *1995* | *1996* | *1997* | *1998* | *1999* | *2000* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lithuania | 4.46 | 4.60 | 2.98 | 2.51 | 2.16 | 2.36 | 2.50 | 2.38 | 2.50 | 2.12 | 2.02 |
| EU | 3.61 | 3.66 | 3.62 | 3.60 | 3.59 | 3.65 | 3.77 | 3.75 | 3.82 | 3.82 | 3.84 |
| Ireland | 2.92 | 2.90 | 2.85 | 2.88 | 3.05 | 3.06 | 3.22 | 3.35 | 3.52 | 3.70 | 3.70 |
| Finland | 5.70 | 5.78 | 5.55 | 5.72 | 6.02 | 5.64 | 6.03 | 6.33 | 6.43 | 6.39 | 6.30 |
| Denmark | 3.54 | 3.86 | 3.73 | 3.78 | 3.90 | 3.86 | 4.33 | 4.02 | 3.94 | 3.79 | 3.68 |
| Slovenia | 3.03 | 2.85 | 2.51 | 2.65 | 2.78 | 2.98 | 3.14 | 3.32 | 3.26 | 3.20 | 3.27 |
| Estonia | 4.82 | 4.33 | 4.18 | 3.30 | 3.45 | 3.21 | 3.52 | 3.69 | 3.54 | 3.31 | 3.23 |
| Latvia | 2.99 | 2.35 | 2.27 | 1.90 | 1.83 | 1.60 | 1.66 | 1.76 | 1.78 | 1.60 | 1.53 |
| Czech Republic | 4.58 | 4.16 | 4.19 | 4.05 | 3.91 | 4.01 | 4.13 | 4.15 | 4.00 | 3.75 | 3.93 |
| Poland | 2.61 | 2.57 | 2.54 | 2.63 | 2.51 | 2.59 | 2.79 | 2.68 | 2.51 | 2.42 | 2.33 |
| Slovak Republic | 4.10 | 3.73 | 3.43 | 3.30 | 3.17 | 3.28 | 3.33 | 3.24 | 3.24 | 3.33 | 3.24 |
| Hungary | 2.75 | 2.64 | 2.45 | 2.48 | 2.42 | 2.50 | 2.55 | 2.50 | 2.49 | 2.51 | 2.49 |

accession countries is presented in Table 1 (IEA statistics, 2001).

One can that TPES/capita in Lithuania in 1990 was higher than the EU average, but during 10 years it decreased significantly and in 2000 became almost 2 times lower than the EU average level. TPES per capita in 2000 was the lowest in Latvia. In Lithuania this indicator was at the same level as in Poland and Hungary or slightly higher than in Latvia. Slovak Republic, Estonia and Slovenia make the second group of accession countries in which TPES/capita is almost 1.5 times higher than in the previous group. Only in Check Republic TPES/capita in 2000 was at the same level as in the EU.

In Figure 1 final energy consumption per capita in Lithuania and in a few EU member states having a similar size of territory, population and similar climate conditions (Finland, Denmark, Ireland) is presented. In 1990, final energy consumption per capita in Lithuania exceeded the EU average, but in 2000 it became 2.5 times lower than the EU average. Final energy consumption per capita in Denmark and Ireland is almost equal to the EU average. In Finland this index is very high, because of the high final energy intensity of economy and particularly industry, comparatively low energy prices, high population income and low population density.

Though Denmark has a similar industrial structure as Lithuania, similar climate, size of territory and population, final energy consumption per capita is significantly lower in Lithuania. This can be related mainly with the high energy prices versus low income and low GDP per capita characteristic of Lithuania. GDP per capita in Denmark is almost 4 times higher than in Lithuania.

Electricity generation and use is one of the main criteria for assessing progress. The average electricity consumption in industrial countries was about 9000 kWh/year/capita in 2000. In terms of average rates of electricity utilisa-

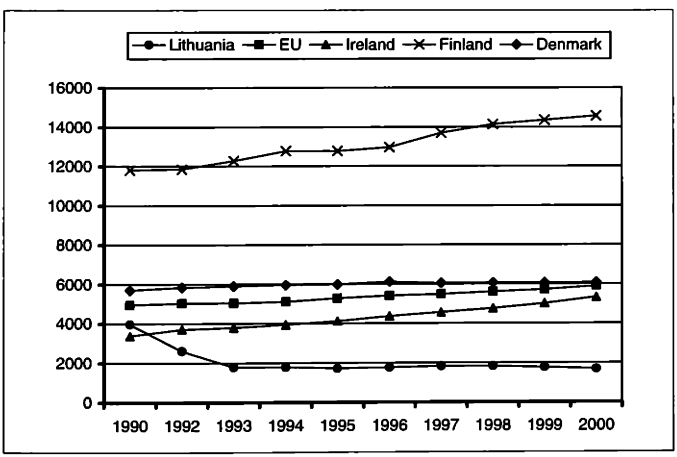


*Fig. 1. Final energy consumption per capita in Lithuania and some EU member states*

tion, there are wide differences among industrial countries. In countries in transition this indicator was 4250 kWh/year/capita (Energy in Lithuania, 2001). In Fig. 2 electricity consumption per capita in Lithuania, Finland, Ireland and EU are presented. One can see that electricity consumption in Lithuania in 2000 was more than three times lower than the EU average and even twice lower than the average level of transition economies. Even in 1990 electricity consumption per capita in EU was about 20% higher than in Lithuania. During 1990–1994 the difference between Lithuania and the EU increased sharply. Since 1994 the stabilisation of electricity consumption per capita can be noted in Lithuania. Nevertheless, in the EU electricity consumption per capita is still increasing; at the same time final energy and TPES per capita in the EU tend to stabilise. Thus, final energy and electricity consumption per capita in Lithuania is very low as compared to the EU level, and the convergence of these indicators needs some time.

From analysis of energy consumption some interesting conclusions can be drawn. TPES consumption per capita was decreasing in Lithuania from 1990 to 2000 and was almost stable or slowly increasing in the EU during the same period. Final energy consumption per capita in Lithuania currently is 2.5 times lower than in the EU and over the last 10 years has been continuously decreasing, whereas it is slowly increasing in the EU, so the gap between final energy consumption level in EU and Lithuania keeps increasing. Only since 2000 some slight trends of increase in TPES and final energy consumption per capita can be noted in Lithuania.

A comparison of energy consumption per capita in Lithuania and in some EU member states having a similar size of territory, population and similar climate conditions shows that in Ireland and Denmark energy consumption per capita is the same as the EU average. In Finland energy consumption per capita is very high, because this country is characterized by

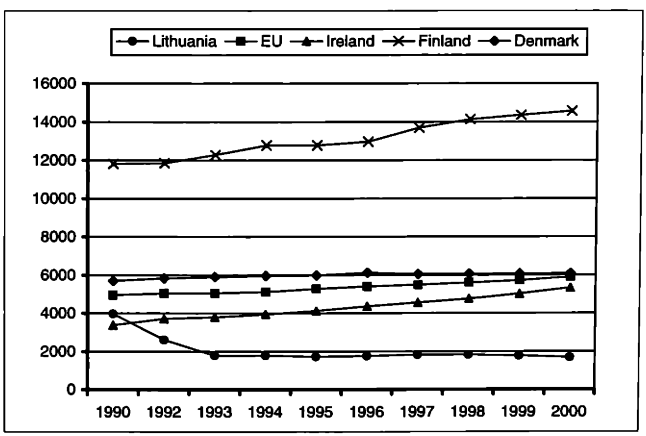


*Fig. 2. Electricity consumption per capita in Lithuania, EU, Denmark, Finland and Ireland*

a high energy intensity of economy and industry in particular, comparatively low energy prices versus high population income and low population density.

Comparing energy consumption per capita in Lithuania and in other 7 accession countries, one can notice that this indicator for Lithuania is among the lowest in the accession countries. Only in Latvia TPES per capita is lower than in Lithuania. This can be explained by a low energy intensity of Latvian economy and industry and a high energy efficiency of the Latvian energy sector as compared to Lithuania and other accession countries. Therefore final energy consumption per capita in Latvia is higher than in Lithuania and other accession countries (Hungary, Poland, etc).

The gap in convergence between electricity consumption per capita in Lithuania and the EU is very high (more than 3 times) and well corresponds to the gap in GDP/capita. The trend of electricity consumption per capita was negative in Lithuania up to 2000. This trend is considered negative, because the increase in economic growth and quality of life depends on a sufficient electricity consumption per capita. Low final energy and electricity consumption per capita may be a factor determining the low income and living standards in Lithuania. Therefore a further analysis of energy affordability is necessary to define the reasons for such a low final energy and electricity consumption and the measures to improve the situation.

The great difference between TPES and final energy consumption per capita shows a low energy conversion efficiency in the Lithuanian energy system is comparison with the EU. Further studies and measures are needed to improve this index.

## 2. Energy intensity

The TPES/GDP index shows the trends in overall energy use relative to GDP. It indicates the general relationship of energy consumption to economic development and is very relevant for assessing the progress towards sustainable energy development. In 2000, in Lithuania TPES/GDP amounted to 0.34 toe/thou 95 US$ PPP, i.e. or was almost twice higher than the same index for 15 EU countries (the EU average was 0.18 toe/thou 95 US$ PPP in the same year). However, by 1996 Lithuania begun to make steady improvements in energy efficiency (Energy Balance, 2001). One can see that primary energy intensity in Lithuania is higher than in Finland, though the latter country has achieved high energy intensity and energy consumption levels among other EU member states. Primary energy intensity in Denmark and Ireland is similar to the EU average.

A very important index is final energy intensity. Final energy intensity in Lithuania, Denmark, Finland, Ireland and the average of EU countries are presented in Figure 4, which shows that in 2000 final energy intensity in Lithuania was 1.3 times higher than in the EU. But in 1990 it was even more than 2 times higher than in the EU. The positive trends in final energy intensity decrease show final energy use efficiency improvements in Lithuania. The overall final energy intensity is still quite high in Lithuania and significantly exceeds the EU average level and the situation in Denmark as well as in Ireland. In Finland, final energy intensity is higher than in Lithuania, but as mentioned above this country has one of the highest energy intensities of economy in the EU. Such a great difference between primary and final energy intensity in Lithuania can be explained by huge losses in

energy conversion and the low energy efficiency in the energy sector.

From the analysis of energy intensity (TPES/GDP PPP, final energy/GDP PPP) the main conclusion is that in the EU the positive trends in the decoupling of final energy and electricity consumption per capita from final energy and electricity intensity can be noticed. In Lithuania, final energy and electricity intensity of GDP was decreasing more slowly than final energy and electricity consumption per capita up to 2000. These trends have been slowly changing since 2001.

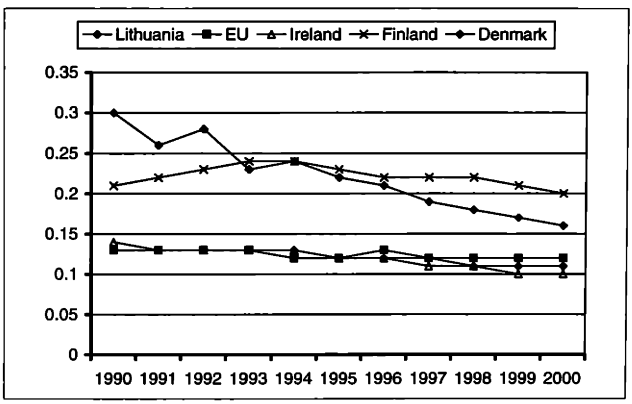


*Fig. 3. Final energy intensity in Lithuania, Denmark, Finland, Ireland and EU*

Since 2001, GDP per capita growth rates in Lithuania exceed GDP growth rates in the EU. Primary energy intensity decrease rates are also much higher in Lithuania than in the EU member states. Only in Ireland final energy intensity is decreasing and GDP is increasing at similar rates as in Lithuania. These positive trends need to be maintained and enhanced in this country.

Today in Lithuania especially high is primary energy intensity (twice higher than the EU average). It is higher than in Finland, though in this country TPES/GDP is approximately 1.3 higher than the EU average. Seeking to define the impact of the structural changes of economy on the energy intensity decrease, a less aggregated analysis of energy intensity is necessary for Lithuania.

## 3. Structure of economy

By analysing energy intensity on less aggregated levels we will further investigate trends in energy intensity of different branches of economy. The desirable structure of economy might be explained from the energy intensity decrease approach. The increase of shares in GDP value added of economic branches consuming less energy is the favourable trend to reduce energy intensity of GDP. The share of sectors in GDP value added has also a significant impact on energy consumption per capita and of course on energy intensity of GDP.

In Figure 4 the final energy intensities and shares of value added are presented by economic sectors.

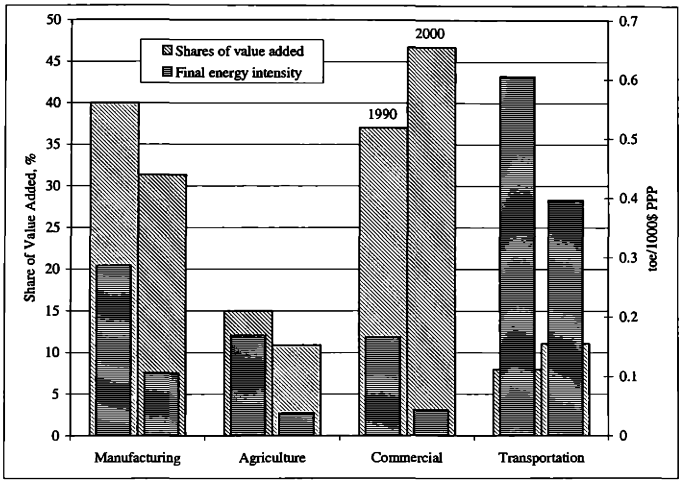


*Fig. 4. Lithuania: final energy intensities and value added shares in sectors*

Figure 5 shows that the shares of value added are highest in the commercial sector and the final energy intensity is lowest in this sector. The share of value added in the transportation sector is low and the energy intensity is the highest in this sector. Since 1990 the share of value added from the commercial sector increased, at the same time decreasing the final energy intensity of GDP. The share of value added from manufacturing decreased and the final energy intensity decreased as well. In general, energy intensity has decreased in all branches of economy since 1990. The share of value added decreased in manufacturing and agriculture. All these trends have an impact on the decrease of final energy intensity of GDP in Lithuania.

Comparing energy intensity in Lithuania and Denmark one can conclude that in Denmark the structure of economy, though quite similar to that of Lithuania, is more favourable in terms of energy intensity, because household and transport, which do not produce a significant value added, comprise 50% of consumers of final energy in Denmark and 66% in Lithuania (Table 2).

The structure of economy has dramatically changed in Lithuania since 1990. The share of value added of manufacturing decreased and of the commercial sector, which is least energy intensive, increased. In general, energy intensity has decreased in all branches of economy since 1990. All these trends had a positive impact on the decrease of final energy intensity of GDP in Lithuania.

The positive trends in final energy intensity decrease and the structural changes in favour of less energy consuming branches should be maintained and enhanced in the future in order to accelerate convergence in Lithuanian energy intensities with EU member states. The efficient use of energy resources and energy conservation is the priority of energy policy in Lithuania and is guaranteed by implementa-

*Table 2. Final energy consumption and GDP structure in Lithuania and Denmark (2000)*

| | *Denmark* | | *Lithuania* | |
|---|---|---|---|---|
| Economic sector | Final energy consumption structure | GDP structure | Final energy consumption structure | GDP structure |
| Manufacturing | 20 | 28 | 22 | 31 |
| Agriculture | 7 | 3 | 3 | 11 |
| Household | 29 | | 35 | |
| Transport | 32 | | 28 | |
| Commercial sector | 12 | 69 | 12 | 58 |

tion of the constantly updated National Energy Efficiency Programme (2001). The same polices should be followed in the future.

## 5. The convergence between developed and transition countries in energy intensity and energy consumption

As the transition countries of East and Central Europe (CEE) move towards a market-based system, the expectation is that the key indices of economic, social and environmental performance will converge to those of the existing market economies. Given the proximity of the CEE to the EU-15, and given the moves to EU membership, this convergence should be especially close between the transition countries and the EU.

A considerable amount of research has been done on convergence of per capita income between the poorer and richer countries of the world. Economies are assumed to be converging if the income of poorer economies grows faster over time relative to that of the richer economies, thus reducing inter-country income inequality. Sala-i Martin (1996) studied and compared the rate of income convergence across various datasets, which included a sub-sample of OECD countries, states within the United States, prefectures of Japan, and regions within several European countries. Across the datasets, the rate of convergence was found to be similar (about 2% per annum). Kaitila (2004) studied income convergence among two groups of countries (15 EU countries and 7 CEEC countries) and found the rate of convergence for each of the two groups to be approximately 0.02% and 0.03%, respectively. Other sources, for instance, those reported by Bunyaratavej and Hahn (2002), Wagner and Hlouskova (2002), and Dela Fuente (2003), extended their analysis of income growth and included other elements besides income, e.g., employment, labor productivity, technological diffusion and exchange rate volatility. For 15 EU member countries, Bunyaratavej and Hahn (2002) found an income convergence rate of 1.6%, while Wagner and Hlouskova (2002) analyzed data on 14 EU countries (without Luxembourg) and found the rate of convergence to be between 0.01 % to 0.02 %. On the other hand, Dela Fuente (2003) found 0.03% for the OECD countries.

Analysis of convergence in the area of energy intensity between the transition countries and the EU was based on econometric models (Greene, 200). As real incomes converge, one might expect energy intensity also to converge. The relationship between GDP and Total Primary Energy Supply (TPES) is found to be broadly log-linear, with an elasticity of TPES

with respect to GDP of 0.75 in developed countries and unity for developing countries (the average across all countries was 0.85). These results are from WEC (2000) and are based on data from 1982. The significant differences between developing and developed market economies have two origins: (a) the transformation of some unaccounted non-commercial energy into commercial energy when the economy grows; and (b) the relocation of some industries, because the economic inputs, mostly labour and energy, are cheaper in the developing than in the developed countries. Most importantly, however, with these elasticities, even if there is a convergence in real per capita income, there will not be convergence in energy intensities (Markandya et al., 2004).

There is an active debate within the transition countries themselves as to whether total energy use should grow as the GDP grows. Presently these countries have a lower level of energy efficiency (higher intensity) than the current EU member states. If the convergence is fast enough, and if the growth is modest, there may be no increase in total energy use. In that case a target of non-increasing energy may be feasible and desirable as part of a sustainability strategy. If, on the other hand, the convergence is slow and the growth rapid, it will not be feasible to set a target of this kind. Finally the analysis will show which countries are converging more rapidly and which are not. With a further investigation of the reasons for these differences, we will be able to develop policies to promote convergence.

An analyzis of income growth and energy efficiency for the transition countries in light of their integration to the European Union was carried out (Markandya et al., 2004). A transition country's rate of energy intensity was assumed to be a function of the disparity in income between the country and an *average EU* country. Our analysis was divided into two parts. First, the trend in the income disparity variable was observed and later its impact on energy intensity was assessed. The movement of this exogenous variable over time is critical for determining the direction of the energy intensity growth rate later on. Subsequently, a relationship between the said two variables together with other regressors was tested. Particularly, the aim was to: (a) determine how energy efficiency in general is evolving in the transition economies; (b) test the assumption that energy efficiency in these economies, which are being increasingly linked to the EU, is converging to that of the EU; and (c) ascertain the likely path for energy consumption until the year 2020, both in absolute terms and relative to the EU.

The relationship between energy intensity was investigated in 11 countries of Eastern Europe that can broadly be considered as in transition to a full market economy or as the present EU members. In terms of per capita growth there is evidence of convergence between these countries and the EU-15 average. The rate at which the two converge is estimated at about 0.3% per annum over the period 1990 to 2001.

The existence of convergence in terms of per capita income is not a guarantee of convergence in terms of energy intensity. A casual look at the data on the latter shows some evidence of convergence, and a carefully estimated econometric model of lagged adjustment confirms these findings. The data show that, on average, a one per cent decrease in the per capita income gap between developed and transition economies leads to a decrease in the energy intensity growth rate of a transition country by 0.7%. There are differences in

the rate of convergence across the countries, and they depend on two parameters that are allowed to vary across the countries: the elasticity of a desired energy intensity with respect to the per capita income gap and the rate at which actual energy intensity adjusts to the desired energy intensity. The first parameter is statistically significant for 6 countries of 12 (Hungary, Romania, Czech Republic, Bulgaria, Croatia and Turkey), and the second is statistically significant for 8 of 12 countries (all except Hungary, Slovenia and Lithuania). The fastest converging countries according to these parameters are the Czech Republic, Bulgaria, Croatia and Turkey.

Although these parameters are not significant for all countries, the estimation of energy intensity forecast for 7 of them for which the forecast values of GDP growth are available to 2020 (Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland and Slovak Republic). The results showed that over the period to 2020 we can expect energy intensities to converge significantly to EU-15 levels for six of the seven countries – i.e. all except Estonia. We also estimate the actual level of energy demand in each of these countries and find that between 2000 and 2020 energy demand will increase in all 7 countries in spite of the major decline in energy intensity. Thus, it will not be feasible to use as a target a non-increasing level of total energy consumption.

## Conclusions

Final energy consumption per capita is more than 2 times lower in Lithuania than in the EU and was continuously decreasing during the last decade. Only since 2001 some new trends can be noted. They can be associated with the high rates of GDP growth (2001 – 6.5%; 2002 – 6.7%; 2003 – 6.8%). At the same time final energy consumption per capita is slowly increasing in the EU-15. Therefore the convergence of these indices needs some time. The low final energy and electricity consumption per capita reflects the low income and low living standards in Lithuania and raises the question about energy affordability. In view of quite a low final energy consumption per capita in Lithuania and the same level of TPES per capita in Lithuania and the EU-15, one can conclude that the energy conversion efficiency in the Lithuanian energy system is low.

In the EU-15, positive trends of the decoupling of final energy and electricity consumption per capita from final energy and electricity intensity can be noted. In Lithuania, final energy and electricity intensity of GDP is decreasing more slowly than final energy and electricity consumption per capita. In Lithuania especially high is primary energy intensity of GDP (more than twice higher than the EU-15 average). Seeking to define the impact of the structural changes of economy on the energy intensity decrease, a less aggregated analysis of energy intensity was performed, based on the analysis of structural changes in economy.

The structure of economy has dramatically changed in Lithuania since 1990. The share of value added from manufacturing decreased and from the commercial sector, which is least energy-intensive, increased. In general, energy intensity has decreased in all branches of economy since 1990. All these trends have an impact on the decrease of final energy intensity of GDP in Lithuania. These trends should be maintained in the future by implementing energy efficiency policies in sectoral policies.

As the transition countries of East and Central Europe (CEE) move towards a market-based system, the expectation is that the

key indices of economic, social and environmental performance will converge to those of the existing market economies. Given the proximity of the CEE to the EU-15, and given the moves to EU membership, this convergence is expected to be especially close between the transition countries and the EU.

In terms of per capita growth, there is an evidence of convergence between the new EU member states and the EU-15 average. The rate at which the two converge is estimated at about 0.3% per annum over the period 1990 to 2001. The existence of convergence in terms of per capita income does not guarantee convergence in terms of energy intensity. A carefully estimated econometric model of lagged adjustment confirms convergence in energy intensities. The data show that on average a 1% decrease in the per capita income gap between developed and transition economies leads to a decrease in the energy intensity growth rate of a transition country by 0.7%. The analysis has indicated that the new EU member states are converging in terms of energy consumption per capita as well: the energy demand levels between 2000 and 2020 show an increasing demand in all transition countries despite the reductions in energy intensity. Therefore, it will not be feasible to use as a target a non-increasing level of total energy consumption.

The high GDP per capita levels allow to achieve other aims (social and environmental) of sustainable development, such as low income disparities and low resource- and consequently emission-intensive economy. Of course, these targets of sustainable development cannot be achieved without the management of sustainable development and policy tools promoting progress towards sustainability.

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## ENERGIJOS VARTOJIMO IR ENERGIJOS INTENSYVUMO KITIMO TENDENCIJOS IŠSIVYSČIUSIOSE IR PEREINAMOSIOS Į RINKOS EKONOMIKĄ ŠALYSE

**Dalia Štreimikienė**

Santrauka

Straipsnyje nagrinėjamos energijos vartojimo ir energijos intensyvumo kitimo tendencijos Lietuvoje bei kitose naujose ES narėse ir ES šalyse senbuvėse siekiant įvertinti šias tendencijas pagal darnios plėtros koncepciją. Atlikta analizė naudojant ekonometrinius metodus parodė, kad naujų ES narių pagrindiniai ekonominiai rodikliai konverguoja su ES 15 šalių senbuvių pagrindiniais rodikliais. Galima tikėtis, kad Lietuvos BVP vienam gyventojui, energijos intensyvumas bei vieno gyventojo energijos suvartojimas, jeigu nevisiškai konverguos, tai labai priartės prie vidutinio ES 15 šalių senbuvių lygio.

Kitas svarbus aspektas, kuriam straipsnyje taip pat skiriama dėmesio – darnios plėtros socialinių, ekonominių ir aplinkosauginių dimensijų suderinamumas. Įvairių autorių darbai bei *Kuznets* ekologinė ir klasikinė kreivės parodo, kad, pasiekus tam tikrą ekonominio augimo lygį, galima užtikrinti didesnį pajamų paskirstymo gyventojams tolygumą ir mažesnę neigiamą įtaką aplinkai.

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