



THE CONNECTION BETWEEN SUSTAINABLE DEVELOPMENT AND ENERGY CONSUMPTION IN THE EU, HUNGARY AND LITHUANIA

Zsuzsanna D. Németh¹, Mykolas Navickas², Mária Fekete-Farkas¹

¹Szent István University, Hungary, ²Management Consulting Company "Civitta", Lithuania

Annotation

Since the industrial revolution with the increase of economic-, industrial- and agricultural production the pollution of the environment was increased not only in the air, but also in the natural waters and soils. As a result of the technological development and population increase the land use has changed. At the same time with the decreasing biodiversity the size of the area covered by forests has considerably decreased. Moreover, due to the economic development the demand on natural resources is getting higher and higher.

As the managing of ecological and economic problems can be realized by international collaboration only, several multilateral agreements have come into force to manage the connection between the energy-, economy-, environment- and climate policy to insure sustainable development.

In the interest of sustainable development by the ratification of the Kyoto Protocol 140 countries undertook to decrease and limit the emission in 1997. The improvement of energy efficiency, the protection of sustainable agricultural systems, the development of renewable energy sources as well as harmonizing the national policies were included among the suggested methods to combat global warming.

According to the Kyoto Protocol, ratified in 1997, the representatives of developed countries had committed themselves to reduce greenhouse gas emissions by at least 5 per cent below the 1990 level in the period 2008-2012. Taking into consideration the sustainability, the EU wants to ensure a 20% measure in its new energy strategy concerning three areas of energy utilisation. On the one hand, it is necessary to reduce the greenhouse gas emission by at least 20%, on the other hand the energy efficiency has to increase by 20% and thirdly, the proportion of renewable energy sources has to increase to 20% in the total energy consumption from the 1990 level till 2020.

The study focuses on the situation and changes of the energy market of Hungary and Lithuania among the states of the European Union with special emphases on the distribution and change of energy utilization in the European Union and the member states. As the sustainable growth is not separate from the change of climate- and energy policy that is why the article has special attention to the sustainable development and the role of renewable energy resources as key statistical indicators.

KEY WORDS: sustainable development, energy; European Union; Hungary; Lithuania.

Introduction

The climate of the earth has undergone significant changes in the last decades. Beside the natural climate determinant factors, human activity was proven to have participated in the changes. This is indicated by the frequency and increase of natural disasters getting stronger and stronger such as floods and droughts. Since the industrial revolution the usage of fossil fuel, the agricultural production, deforestation, energy production, industry and transport all contributed to the growth of greenhouse gasses in the atmosphere hereby increasing the average temperature of the earth.

As a result of rising temperature the area of arctic ice is decrease, the level of seas increase, the spread of pest and pathogens' hibernation and migration increase, the wintering possibility and place changes as well as the difficulties of adaptation of species can cause accelerating extinction. According to forecasts mankind is going to face difficulties in the case of water and food products. Beside the limit of natural resources the agricultural productivity of each country going to drop. The effect of extreme weather conditions substantial crowds may be forced to leave their homes to migrate areas what richer in natural resources. All of the previously mentioned facts make the economic development more difficult.

These processes effect not only the EU but also all the countries of the Earth, all classes of society, the

enterprises and the households too. To stop and decrease these effects collaboration is needed. National and international agreements should be able to ensure a common adaptation and the sustainable development.

The Brundtland Commission's report (WCED 1987) defined sustainable development as „Development that meets the needs of the present without compromising the ability of future generations to meet their own needs”. The CGIAR's mission statement in 1989 defines it as „successful management of resources for agriculture to satisfy changing human needs while maintaining or enhancing the quality of the environment and conserving natural resources” (TAC/CGIAR 1989). As argued by Stückelberger (1999) it is important to add two more dimensions: „human dignity” and „non-human environment”. The basic definition of sustainable development for the present work therefore reads as follows (Stückelberger 1999, modified) „Sustainable development allows the life in dignity for the present without compromising a life in dignity for future generation or to threaten the natural environment and endangering the global ecosystem.”

The Europe 2020 strategy is the persuance the of the inaugurated Lisbon strategy. It builds in those experiences and creates a new, common, economic policy system of goals and the corresponding-provision plan.

The „Europe 2020 a strategy for smart, sustainable and inclusive growth” (COM (2010) 2020) came into force in 2010 composes developmental strategy to 2020.

The aim is that the EU economy be intelligent, sustainable and inclusive taking into consideration the long run challenge of the EU such as globalisation, the pressure of resources and the ageing. These three priorities mutually confirm each other, contributing to increase of the employment, productivity and the economical cohesion not only in the European Union but also in the Member States.

The EU wants to realise five determined aims on the area of employment, research and innovation, education, poverty, climate change and energy to 2020. To fulfil these aims, each member states adopted their own national targets in the mentioned areas which were laid down in national documents and submitted to the Commission as National Reform Programme and Convergence Programme.

The determined underlined targets of the Commission to achieve till 2020 are the following:

- 75% of the population aged 20-64 should be employed,
- 3% of the EU's GDP should be invested in R&D,
- The 20/20/20 climate/energy targets should be met (including an increase to 30% of emissions reduction if the conditions are right),
- The share of early school leavers should be under 10% and at least 40% of the younger generation should have a tertiary degree,
- 20 million less people should be at risk of poverty.

The Commission is putting forward seven flagship initiatives to encourage the progress under each priority – which obligatory both the EU and the member states - to motivate the progress such as „Innovation Union”, „Youth on the move”, „A digital agenda for Europe”, „Resource efficient Europe”, „An industrial policy for the globalisation area”, „An agenda for new skills and jobs”, and „European platform against poverty”.

Although the above mentioned targets and initiatives create a complex range of subjects, the aim of the present paper is not to introduce the whole Strategy, but rather to analyse the highlight initiation of „Resource efficient Europe” inside the „Sustainable growth”.

The aim of the emphasize initiative called „Resource efficient Europe” is the disjunction from the economic growth the use of resources, support moving towards the low carbon economy, increase the use of energy resources, and modernise the transport sector and promote energy efficiency” (COM (2010) 2020).

The extension of sustainable growth is building a resource efficient, sustainable and competitive economy, exploiting Europe's leadership in the race to develop new processes and technologies, including green technologies, accelerating the roll out of smart grids using ICT-s, exploiting EU-scale networks, and reinforcing the competitive advantages of our businesses, particularly in manufacturing and within our SMEs, as well though assisting consumers to value resource efficiency. Such an approach will help the EU to prosper in a low carbon, resource constrained world while preventing environmental degradation, biodiversity loss and unsustainable use of resources. It will also underpin economic, social and territorial cohesion (COM (2010) 2020).

The Strategy wants to take such efficient steps - in the case of competitiveness, combating climate change, clean and efficient energy – which maximises the benefits and minimises the costs – including the spread of innovative technological solutions. Another target is to decouple the economic growth from the energy use and use resources more efficiency. These cause not only competitive advantages for Europe but also decrease the dependency of foreign resources with regards to raw materials. The priority „Sustainable growth” are the „Resource efficient Europe” and the „An industrial policy for the globalisation area” initiatives.

In order to realise an intelligent, sustainable and inclusive growth the Commission defines five emphases, measurable targets, where the data confirm the measure have to be sufficiently reliable with regards to the different situation of each member states.

Materials and methods

To achieve the aims of Europe 2020 strategy, some other documents were adopted. In October 2014, the European Council agreed on a climate and energy framework for 2030, including further targets for 2030. In March 2015 it expressed its commitment to build an Energy Union with forward-looking climate policy on the basis of the Commission's Framework Strategy (2015), (Thematic fiche 2015).

The Europe 2020 strategy set the objective to reduce greenhouse gas emissions by 20% by 2020 (compared to 1990), increase to 20% the share of renewables in energy consumption and increase energy efficiency by 20% by 2020. To analyse the progress, key statistical indicators for climate and energy were used.

Key statistical indicators:

1. Climate change

One of the main targets of Europe 2020 strategy is a reduction of GHG emissions by 20% compared to 1990 by 2020.

According to the most recent approximated data, EU emissions in 2013 (including international aviation) were 19% below 1990 levels. According to the projections submitted by the Member States in 2013, emissions are expected to be 21% lower in 2020 than in 1990 (including ETS and non-ETS). New projections submitted by Member States in 2015 confirm this trend (Thematic fiche 2015).

2. Renewable Energy

One of the main targets of Europe 2020 strategy is to increase the share of renewables in energy consumption to 20%.

In 2013, the share of renewable energy sources in the final energy consumption of the EU was 15.0% compared to 8.7% in 2005. In 2013 all sectors achieved the plans: renewable energy shares reached 25.4% in electricity, 16.5% in heating and cooling and 5.4% in transport. For electricity and heating and cooling, the deployment of renewable energy sources has been much higher than set out in National Action Plans, though the trajectory for transport has been lower than planned. Although the achievement of 2020 renewable energy target is possible for the EU and the majority of Member States, a number

of Member States will need to take additional measures to reach their 2020 targets (Thematic fiche 2015).

Table 1. Share of renewable energy in gross final energy consumption

	2013	indicative 2013-2014	2020 target
EU28	15.0%	n/a	20%
Hungary	9.8%	6.9%	13%
Lithuania	13.0%	17.4%	23%

Source: Thematic fiche 2015

3. Energy efficiency

One of the main targets of Europe 2020 strategy is to increase energy efficiency by 20% by 2020.

The Energy Efficiency Directive (EED 2012) established a requirement for Member States to set indicative national energy efficiency targets for 2020, which Member States were required to notify the Commission, to analyse these data and estimates the measure of energy savings of the EU to 2020.

Table 2. Indicative national energy efficiency target for 2020

	Primary energy consumption	Final energy consumption
Hungary	26.6	18.2
Lithuania	6.5	4.3
Sum of indicative targets EU28	1531.4	1082.9
EU28 target 2020	1483	1086

(Source: Thematic fiche 2015)

Because of economic recession necessary the complete and timely implementation of EU legislation at national level was necessary, coupled with the fact higher use of Cohesion Funds and innovative financing is essential in reaching national and EU target. Taking into account the latest modified national indicative targets for 2020 expressed in absolute final energy consumption, the savings add up to a 20.2% final energy reduction for the EU28, surpassing the 2020 target (Thematic fiche 2015).

In summary it can be said that the EU in the case of Climate change indicators, is currently on track to meet its Europe 2020 target.

In connection with Europe 2020 Strategy - as it was mentioned earlier - Member States has defined their national targets in their National Reform Programmes, reflecting the current situation of each country. These programmes contain those programmes and measures which countries planned to realise their national targets.

In this material get to introduce the measures of headline indicators and targets in the case of Hungary and Lithuania. The basic data indicated in tables were analysed in a global radar chart. The chart shows the distance of the countries – Hungary and Lithuania – to its national targets and the EU average.

The closer a country is to the center of the “spider web” for an indicator, the greater its distance to the respective national target. Thus the country has to make a greater effort than other countries to meet its national target (Country profiles 2015). According to the comparison it is possible to demonstrate whether a country’s performance is better or worse than the EU average.

The three thematic priorities of the Strategy – smart, sustainable and inclusive growth – contain five headline targets adopted by the EU, such as employment, research and development (R&D), climate change and energy, education, poverty and social exclusion. These targets are monitored using a set of nine headline indicators (Country profiles 2015).

Results

In the analysis the indicators of National Europe 2020 were used and evaluated in the case of Hungary and Lithuania with respect to the EU28 recent and future average.

Hungary

By reducing its GHG emissions in non-ETS sectors by 21,4% until 2012, Hungary remained well below its emissions target to limit emission rises to 10% by 2020. Progress towards the country’s education targets has been ambiguous since 2008. While the country met its national targets on tertiary education in 2013, it did not reduce the share of early leavers from education and training. In terms of R&D expenditure, Hungary was 0,4 percentage points below its national target in 2013 and thus closer than the EU average. The share of renewables in gross final energy consumption has more than doubled since 2005, putting the country slightly closer to its national target than the EU average. Poverty levels, however, have deteriorated in Hungary since the economic crisis began, resulting in a large gap of almost one million people that need to be lifted out of the risk of poverty or social exclusion. Despite the favourable increase in the employment rate from 2010 to 2013, the country had one of the largest gaps to its 75% target (Country profiles 2015).

In the next table the national targets (as defined in the National Reform Programs) and the latest available national data for the headline indicators are shown in the case of Hungary.

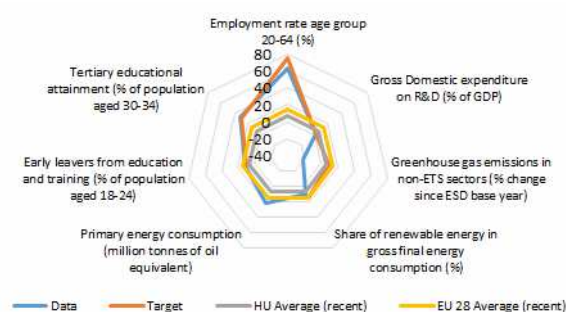


Fig. 1. National Europe 2020 indicators – Hungary
(Source: Own construction)

The blue line contains the data of indicators from 2013 and 2014 published by the member states.

The red line shows the reachable targets to 2020 in the case of 7 indicators in each country.

The grey line presents the average of the measures of Hungarian and Lithuanian actual indicators.

The yellow line of the spider web shows the average indicative data of EU28.

In the case of Hungary, the „Employment rate age group 20-64 (%)” is highly different (63.2%) from other measures. It means, here is the least distance to the respective national target.

The recent „Gross Domestic expenditure on R&D (% of GDP)” is 0.4% less than the national target (1.8%).

The difference between the recent data and future target in the case of „Greenhouse gas emissions in non-ETS sector” is quite high as it does not reach not only the EU28 average (14.55%) but also the Hungarian average (6.9%).

The „Share of renewable energy in gross final energy consumption (%)” is relevant data of Hungary (9.6%) and it approaches the Hungarian average (6.9%) as well as the Hungarian target (14.65%) and is quite similar to the EU28 recent average (14.55%).

The recent data of „Primary energy consumption (million tonnes of oil equivalent)” (21.5) is higher than the EU28 recent average (14.55%).

The „Early leavers from education and training (% of population aged 18-24)” is higher (11.8%) than the respective national target (10%) but lower than the EU28 recent average (14.55%).

The „Tertiary educational attainment (% of population aged 30-34)” is higher (11.8%) than both the national target (30.3%) and the EU28 recent average value (14.55%).

The „People at risk of poverty or social exclusion (thousands)” indicator is not analysed because of it's extremely high value (3285).

Lithuania

Lithuania exceeded both of its national education targets in 2013. It also ranked among the best performing countries across the EU in terms of early leavers from education and training and tertiary educational attainment of 30 to 34 year olds. Additionally, by reducing its GHG emissions by 1.8% by 2012, Lithuania has remained well below its target to limit emission increase to 15%. A 4.7 percentage point increase in the share of renewable energies from 2005 to 2012 has moved the country close to its national target of 23%. After a significant drop between 2008 and 2009, the country's employment rate increased again by 5.6 percentage points between 2010 and 2013, moving it closer to the national target than the EU average. Poverty rates have fallen since 2010, but Lithuania would need to lift another 100 000 people out of poverty to meet its national 2020 commitment. In terms of R&D expenditure, a one percentage point gap needs to be closed for the target of 1.9% of GDP to be reached (Country profiles, 2015).

In the next table the national targets (as defined in the National Reform Programs) and the latest available national data for the headline indicators are shown in the case of Lithuania.

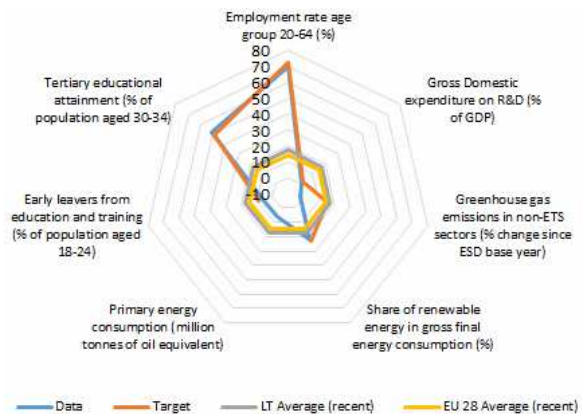


Fig. 2. National Europe 2020 indicators – Lithuania
(Source: Own construction)

The blue line contains the data of indicators from 2013 and 2014 published by the member states.

The red line shows the reachable targets to 2020 in the case of 7 indicators in each country.

The grey line presents the average of the measures of Hungarian and Lithuanian actual indicators.

The yellow line of the spider web shows the average indicative data of EU28.

In the case of Lithuania, the „Employment rate age group 20-64 (%)” is quite different (69.9%) from other measures. It means, here is the least distance to the respective national target.

The recent „Gross Domestic expenditure on R&D (% of GDP)” is lower (0.95%) than the national target (1.9%).

The „Greenhouse gas emissions in non-ETS sector” is much lower (-1.28%) than the national target (15%), but quite similar to both the national average (17.4%) and the EU28 recent average (14.55%).

The „Share of renewable energy in gross final energy consumption (%)”'s relevant data (21.7%) of Lithuania is quite similar to the national target (23%) and higher than the recent average of both Lithuania (17.4%) and the EU28 (14.55%).

The recent data of „Primary energy consumption (million tonnes of oil equivalent)” (5.9) is lower than the EU28 recent average (14.55%).

The „Early leavers from education and training (% of population aged 18-24)” is lower (6.3%) than the respective national target (9%) and lower than the EU28 recent average (14.55%).

The recent data of „Tertiary educational attainment (% of population aged 30-34)” is higher (51.3%) than both the national target (48.7%) and the EU28 recent average value (14.55%).

The „People at risk of poverty or social exclusion (thousands)” indicator is not analysed because of it's extremely high value (917).

Conclusions

Since the industrial revolution with the increase of economic-, industrial- and agricultural production the pollution of the environment increased not only in the air, but also in the natural waters and soils in all over the world.

As the managing of ecological and economic problems can be realized by international collaboration only, several multilateral agreements have come into force to manage the connection between the energy-, economy-, environment- and climate policy to ensure sustainable development.

Beyond the multilateral agreements with the purpose of cooperation on EU level, the targets and tools had been laid down as well as the indicators to ensure the measurements. In the interest of common implementation the Europe 2020 a strategy for smart, sustainable and inclusive growth got to be enforced. It specifies three mutually reinforcing priorities and according to five EU headlines targets it suggests seven flagship initiatives altogether in each priority theme. All these have been put forward to realise high level of employment, productivity and social cohesion as well as in the interest of sustainable future.

The study introduces – according to the latest data – the recent results and future targets of Hungary and Lithuania by the defined indicators of Strategy 2020 compare to the recent average measure of the EU.

The above presented spider chart analyses and its results allowed us to conclude if the examined countries realize and fulfil their targets, than the aim of EU2020 strategy become accessible, the more environment friendly economic growth including all classes of society.

Literature

- COM (2010). Communication from the Commission, Europe 2020, A strategy for smart, sustainable and inclusive growth, Brussels. [revised 2015 09 24], <http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:52010DC2020>
- Commission's Framework Strategy (2015). Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee, the Committee of the Regions and the European Investment Bank A Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy. COM(2015) 80 final, [revised 2015 09 24], <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2015:80:FIN>
- Country profiles (2015). Eurostat Statistical book, Smarter, greener, more inclusive? ISBN 978-92-79-40079-7, doi: 10.2785/55853, Cat. No: KS-EZ-14-001-EN-N, [revised 2015 09 24], http://ec.europa.eu/eurostat/statistics-explained/index.php/Smarter,_greener,_more_inclusive_-_indicators_to_support_the_Europe_2020_strategy
- EC WCED (World Commission on Environment and Development) (1987). Our Common Future (Brundtland-Report). Oxford University Press.
- Energy Efficiency Directive (EED) (2012). Directive 2012/27/EU of the European Parliament and of the Council

of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC Text with EEA relevance, [revised 2015 09 24], <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32012L0027>

- Eurostat Statistical Book (2015). Smarter, greener, more inclusive? Indicators to support the Europe 2020 strategy. Luxembourg: Publications Office of the European Union, [revised 2015 09 24], <http://ec.europa.eu/eurostat/documents/3217494/6655013/KS-EZ-14-001-EN-N.pdf/a5452f6e-8190-4f30-8996-41b1306f7367>
- Stückelberger, C. (1999). Das Konzept der nachhaltigen Entwicklung um zwei Dimensionen erweitern. In: H.-B. Peter (Ed.). Verlag Paul Haupt, Bern, 103-122.
- TAC/CGLAR (1989). AC/CGLAR 1989 successful management of resources for agriculture to satisfy changing human needs while maintaining or enhancing the quality off the environment andd conserving natural reseources, [revised 2015 09 24], http://www.cgiar.org/?s_area=all&s=TAC%2FCGLAR+1989+successful+manag+ement+of+resources+for+agriculture+to+satisfy+changing+human+needs+while+maintaining+or+enhancing+the+quali+ty+off+the+environment+andd+conserving+natural+reseour+ces
- Thematic fiche (2015). European semester thematic fiche, Climate change and energy Source, [revised 2015 09 24], http://ec.europa.eu/europe2020/pdf/themes/2015/energy_and_ghg_targets.pdf

THE CONNECTION BETWEEN SUSTAINABLE DEVELOPMENT AND ENERGY CONSUMPTION IN THE EU, HUNGARY AND LITHUANIA

Summary

The key issue of sustainable development is ther energy issues of development, not just because the energy is the main element of economic growth, but because of that is the main contributor of environmental problems including the climate change.

The steps forward sustainable energy production is well analyzed in the international literature. This paper is focusing on sustainability of consumption.

The study introduces – according to the latest data – the recent results and future targets of Hungary and Lithuania by the defined indicators of Strategy 2020 compare to the recent average measure of the EU.

The results of this research allowed us to conclude if the examined countries realize and fulfil their targets, than the aim of EU2020 strategy become accessible, the more environment friendly economic growth, and increasing wellbeing for all classes of society.

KEYWORDS: sustainable development, energy, European Union, Hungary, Lithuania.

Zsuzsanna D. Németh. PhD Student in Doctoral School of Management and Business Administration in Szent István University (Hungary). Field of scientific research: renewable energy, energy efficiency, e-mail: d.nemeth.zs@gmail.com

Mykolas Navickas. Business Analyst at Management Consulting Company "Civitta" (Lithuania). Field of scientific research: competitiveness, sustainable development, renewable energy, energy efficiency, e-mail: mykolas.navickas@gmail.com

Mária Fekete-Farkas. PhD, Habil, Professor, Szent István University, Faculty of Economic and Social Sciences, Institute of Economics, Law and Methodology, Field of scientific research: valuation and management of production factors, focusing on natural resources, H-2100 Gödöllő, Páter Károly u. 1, Hungary, Tel.: +36-20-970-4987; Fax: +36-28-522-912, e-mail: Farkasne.Fekete.Maria@gtk.szie.hu