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GREEN AWARENESS: CONSCIOUS STEPS TAKEN

ZÖLD TUDATOSSÁG: MEGFONTOLT LÉPÉSEK

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Abstract

Currently, we are experiencing a lot of changes on a global scene. However, as our natural non-renewable resources are finite, continuous development must be ensured by other factors. The ultimate objective is to reach the state of a green economy where sustainability can be maintained. 'Green growth' means an internationally accepted and desirable future. In terms of energy supply a more intense use of renewable energy sources must be accomplished. Preferring local resources makes sustainability possible. One of the priorities for Hungary is improving employment in this industry. Taxation can also ease making the economy greener. The paper analyses statistical data from where conclusions are drawn in the form of tables and figures, as well.

Key words: *development, challenge, economy, environment, sustainability*

JEL CODE: Q15

Összefoglalás

Jelenleg számos változást tapasztalunk a globális szintén. Mivel azonban a természetes megújuló erőforrások végesek, a folyamatos fejlődést más tényezők által is biztosítani kell. A végső cél az, hogy elérjük azt a zöld gazdaságot, ahol a fenntarthatóság megvalósítható. A „zöld növekedés” egy nemzetközileg elfogadott és kívánatos jövő. Az energiaellátás szempontjából meg kell valósítani a megújuló energiaforrások intenzívebb felhasználását. A helyi erőforrások előnyben részesítése is a fenntarthatóságot segíti elő. Magyarország számára az egyik prioritás a foglalkoztatás javítása. Az adózás szintén megkönnyítheti a gazdaság zöldebbé tételét. A tanulmány olyan statisztikai adatokat elemez, amelyekből következtetések vonhatók le táblázatok és ábrák formájában.

Kulcsszavak: fejlődés, kihívás, gazdaság, környezetvédelem, fenntarthatóság

JEL-KÓD: Q15

Introduction

According to some economic theories as our world is finite, continuous development cannot be sustained. Up to date the biological resilience of the Earth has come to an end.

Richard Smalley, a Chemistry professor awarded with a Nobel Prize, has put the most important global challenges of the first upcoming 50 years of the 21st century in the order of their problematic nature, which is the following:

- energy safety, energy supply,
- water supply,
- agriculture and food safety,
- environmental protection, climate change,
- poverty, terrorism, war, epidemics,
- education, democracy, society [SMALLEY 2003].

Population growth, the depletion of resources, the impacts on biodiversity and ensuring sustainability are also causing unsolvable problems.

A book entitled 'Silent Spring' was published in 1962 [CARSON 1962] which lists the severe environmental damaging nature of chemicals. From that time problems of such nature had to be taken seriously. Since the 1970's an ecological attitude has been adapted together with the principle of sustainable development, which significantly differed from the previous paradigm [MEADOWS et al. 1972].

The UN World Commission on Environment and Development promoted and made sustainability widespread.

The commission headed by Gro Harlem Brundtland Norwegian prime minister drafted a proposal on sustainable development. The final report entitled 'Our common future' was published afterwards. [BRUNDTLAND 1987].

"Our Common Future" defined sustainability as follows: "Sustainable development is a development that meets the needs of the present without compromising the ability of future generations to meet their own needs" [LÁNG 2003, p. 23-24].

The characteristics of sustainable society were described in the 1980's according to which a harmony between population growth, the material needs of society, the utilisation of natural resources and minimising environmental pollution must be ensured [FÁBIÁN et al. 2009].

According to the new Hungarian National Sustainable Development Strategy sustainable development policy is a long-term resource management activity [BARTUS 2013]. Three definitions of sustainable development have been accepted.

According to the Brundtland Report (1987) sustainable development is "development which meets the needs of current generations without compromising the

ability of future generations to meet their own needs”. As was stated by the theory of weak sustainability [PEARCE 1993] the total stock of natural capital, human capital and goods produced by mankind as capital should remain constant over time. On the contrary, strong sustainability means that ‘external environmental limits should be met, i.e. output cannot exceed environmental regeneration capacity and the use of renewable energy resources must not exceed the level of their generation’ [DALY 1991].

CONSTANZA (1989) formulated an ecologic definition for sustainability. According to him, sustainable is a state that ensures minimal circumstances for ecosystems to be stable and flexible.

Sustainability is a relation between human economic systems and a more dynamic ecological system which is generally slower to change in which

1. human life can be sustained for a long time,
2. the individual has the chance to make their and their families’ living,
3. human society and culture are able to develop but only when human activity is limited not to destroy diversity, complexity and ecological functions to support life.

If sustainability cannot be met, climate change as a result of air pollution is a serious threat. Changes can be measured by using indicators.

Keeping to the point of sustainability marks a shift to green economy. Meeting the ideas of green economy serves the interest of the whole world including Europe and Hungary and they can only be achieved on a global level.

The paper highlights only some of the most relevant areas of the topic including

- green economy and growth,
- the impact of greenhouse gases in the world, Europe and Hungary,
- energy production on renewable basis, and
- the impact of energy price changes in the USA and in Europe.

Many doubt the quick popularity of new energy resources. KEMPF [2013] makes a reference to the 2008 report of the American National Intelligence Council according to which all existing alternative technologies are unable to substitute for the present energy structure, so the new energy resources are not likely to be widespread as necessary by 2025.

This situation calls for rethinking the strategy and making new decisions.

Three pillars of sustainability were created, including

- Natural-Environmental
- Economic and
- Societal-Social ones [LÁNG 2003].

As a result of the constantly growing population, the primary goals include the production of healthy and fresh food, so farms that contribute to the preservation of rural values through the production of healthy and fresh food using renewable energy are indispensable. [TÉGLA 2015].

Material and method

The paper presents the possibilities of green economy by illustrating tendencies. The data collected are listed in tables and are also analysed in-text. Trend analysis is carried out on the 10-year data of greenhouse gases. The data of the Central Statistical Office were used for evaluation while databases allow for a more detailed analysis of the green economy.

Our hypotheses were as follow.

H1: Within the forthcoming period the significance of the industries that produce renewable energy will grow year by year.

H2: Consequently, the number of employees will also increase in this sector.

Conclusions are drawn on the basis of facts and analyses that could help understand the necessity and development of green economy.

Discussion

Green economy and green growth

The present growth patterns cannot be met, which means that both the world and Hungary must follow an idea of green growth to achieve sustainability. The UN, EU and OECD have a pioneering role in the methodology of green growth. The objective is to use less energy in achieving synergy between economic growth and environmental protection [POMÁZI – SZABÓ 2013]. Economic growth has been qualified as one of the thorough environmental analyses of OECD, which also calls for environmental innovations. However, many would think that in a finite world growth cannot be implemented [Jackson 2012]. Non-growth has a separate economic school by now [MÉSZÁROS 2011]. The UN Environmental Programme sets the objective of green economy. This is aimed at improving human well-being in addition to reducing social inequities to a smaller extent and

environmental loads to a greater extent [POMÁZI 2013a]. The model of green growth can vary from country to country.

According to OECD's Environmental Outlook [OECD 2012] the biggest challenges for both OECD and non-OECD countries are climate change, reducing biological diversity, non-sustainable management of water resources, pollution and the health risks of hazardous chemicals.

Other scientific reports have identified nine potential limits for the ecosystems of the earth three of which, i.e. climate change, global nitrogen cycle and reduction of biological diversity, have already been surpassed [OECD 2012; ROCKSTRÖM et al. 2009].

OECD has identified indicators of progress that need attention (Table 1).

Theme	Topic	Proposed indicator
Environmental and resource productivity	carbon productivity	CO ₂ productivity
	resource productivity	non-energy based material productivity
	multi-factor productivity	multi-factors productivity
Natural assets	renewables and non-renewables	natural resource use indicator*
	biological diversity and ecosystems	changes in land use and land cover
Environmental quality of life	environmental health and risks	air pollution (PM _{2,5} affected population)
Economic opportunities and political responses	technology and innovation, environmental services and amenities, prices and transfers	reserved place (by taking national characteristics into consideration)

Table 1 OECD green indicators of progress

*in progress, tested on the data of Australia and Canada but needs further testing whether it is robust enough on different national characteristics.

Source: OECD, 2011.

In order to make economic progress in our sustainable future the traditional (fossil) fuels must be replaced by an economic model based on alternative, mainly renewable, resources of green technologies. The investment cost of installing wind and solar energy technologies is significantly lower than the cost of those using fossil fuels. [CHIKÁN 2018] (Figure 1)

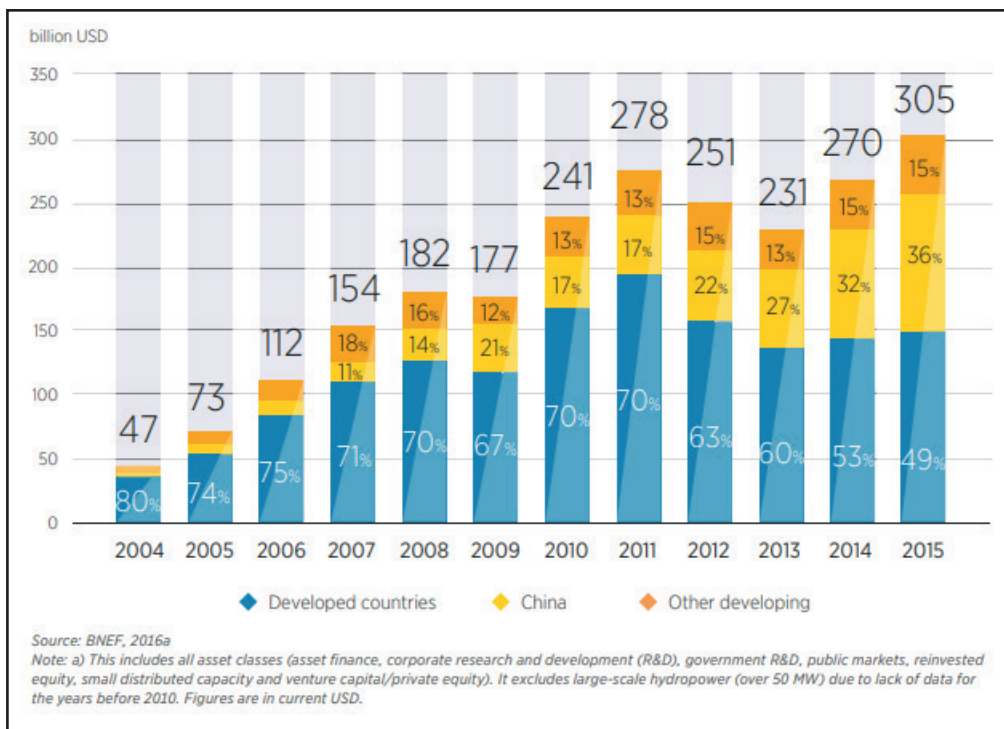


Figure 1 Global investment in renewables, and share by geography, 2004-2015

Source: Cited in IRENA 2017

As we can see from Figure 1 in the past ten years the amount invested in wind and solar energy increased, which can be explained by more likely returns and the existing technologies. According to IRENA data nowadays wind and solar energy investments have been on the rise (Figure 2).

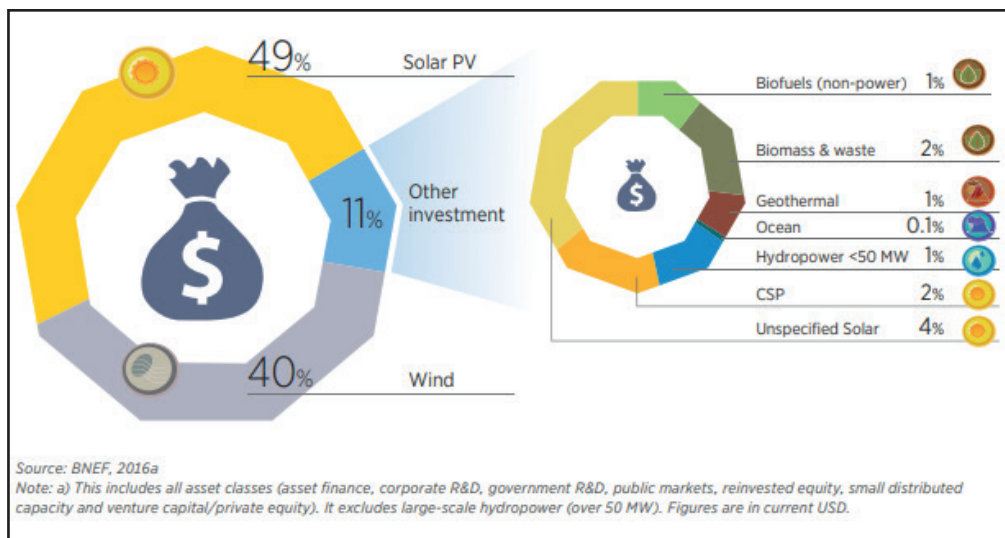


Figure 2 Global investment in renewables by technology, 2015

Source: Cited in IRENA 2017

However, the investments in renewable energies involve several risks and to offset them, no or only partial strategies can be worked out. [LEE – ZHORG, 2015].

In 2015, there was a slight downturn in the renewable energy supply, which is due to low oil and natural gas prices, but the investment has remained unsatisfactory due to government subsidies [INTERNET 3]

China is the biggest investor in the energy market.

According to IJ Global investments in renewable energies can take the following forms.

- solar collectors
- waste recycling
- biofuel production
- geothermal energy
- land-based wind power projects
- utilization of biomass
- ebb / flow power plants
- photovoltaic solar projects
- waterworks projects

The New Széchenyi Plan published in January 2011 regards developing green economy as a priority and declares an obvious connection between environmental industries (green economy development) and employment as well as the development of small-and medium-sized enterprises.

In the period 2014-2020, EU sources are available to our country. Applications for renewable energy investments from the European Structural and Investment Funds in several sectoral and territorial operational programmes include

- The Rural Development Operational Programme (VP)
- Territorial and Settlement Development Operational Programme (TOP)
- Economic Development and Innovation Operational Programme (GINOP)
- The Environmental and Energy Efficiency Operational Programme (KEHOP)
- The Competitive Central Hungary Operational Programme (VEKOP)
- HORIZON 2020 (innovation, research and development projects related to energy and environmental protection)

Source of domestic budgetary resources:

- Otthon Melege Programme

Government measures for the production of electricity from renewable energy sources:

- METAR - Available from 1 January 2017 (INTERNET 2)

The European Commission has set out a strategy for smart, sustainable and inclusive growth in the Europe 2020 programme.

The measurable EU objectives to be achieved by the Committee were as follows:

- Employment (75% of people aged 20 to 64 should work)
- Research and innovation (invest 3% of EU GDP in R & D)
- Climate change and energy management (reducing greenhouse gas, increasing renewable energy, increasing energy efficiency)
- Combating poverty and social exclusion
- Education (early school leavers decline below 10%, increase of tertiary education among 30-34 year-olds) [EUROPE 2020]

The targeted areas of Green Economy development Programme are green energy, energy efficiency, green education, employment and shaping attitudes and values as well as green R&D&I. Priority is given to the use of geothermal energy [TÉGLA, 2015; TÉGLA - SZŰCS, 2015], the development of greenhouses, the complex use of thermal, medicinal and mineral waters as well as health industry

innovation where technological characteristics are of primary importance within the Health Care programme.

The European Commission has published promising prospects on employment. The job generating capacity of the non-renewable energy sector was estimated to be 3 million by 2020 while further 2 million green jobs can be created while implementing energy efficiency measures. Reducing the total raw material input of the EU by 17% can result in 1.4-2.8 million new jobs and recycling the most important raw materials ensures the living of 560 thousand people by 2025. A more efficient waste management can secure a living for more than 400 thousand people by 2020 [POMÁZI, 2013; EUROPEAN COMMISSION, 2012]. Sustainability can be achieved by prioritising local resources. The environmental systems can only be loaded to their capacity. The ecological features of the environment must be maintained unchanged while energy use must be in harmony with sustainability [SCHMUCK, 2010; LADANAI – VINTERBÄCK, 2009].

Energy demand and renewable energy resources

Growing population also means growing energy demand. Growth is inevitable even if energy production is curbed. Growth will not affect OECD countries. Instead, developing countries will be concerned.

The 2012 IEA – WEO data reflect the moderate reduction of the rate of coal production and growth of natural gas use (Table 2).

	1990	2010	2015	2020	2030	2035	Average growth rate for 2010-2035
coal	2 231	3 474	3 945	4 082	4 180	4 218	0.8%
crude oil	3 230	4 113	4 352	4 457	4 578	4 656	0.5%
natural gas	1 668	2 740	2 993	3 266	3 820	4 106	1.6%
nuclear	526	719	751	898	1 073	1 138	1.9%
hydro	184	295	340	388	458	488	2.0%
biomass and waste	903	1 277	1 408	1 532	1 755	1 881	1.6%
other re- newable	36	112	200	299	554	710	7.7%
Total	8 779	12 730	13 989	14 922	16 417	17 917	1.2%

Table 2 Growth in global energy demand in Mt oil equivalents

Source: IEA – WEO, 2012.

Air pollution has continuously been present since the Industrial Revolution. However, the potential amount of renewable energy resources would meet twenty times the total energy amount demanded by mankind.

The Intergovernmental Panel on Climate Change (IPCC) of the UN concluded that renewable energy sources could cover 80% of the total energy demand of mankind for four decades. To this end, the government should make policies on green energy. Today the technology of green energy production costs more than the use of crude oil, coal or natural gas. To avoid global warming, the production of renewable energy sources should be increased twentyfold [IPCC, 2011]. Table 3 presents the global technical potential of renewable energy resources.

Energy source	Global technical potential (EJ)
Solar energy	1 575 – 49 837
Geothermal energy (electricity)	118 – 1 109
Wind energy	85 – 580
Biomass	50 – 500
Geothermal energy (heat)	10 – 312
Ocean energy	7 – 331
Hydro energy	50 – 52

Table 3 The global technical potential of renewable energy resources

Source: IPCC, 2011.

Solar energy would cover the total energy demand of mankind if technical problems were solved.

Renewable energy technologies, capacity and output are gaining ground. The sector offers new jobs, new markets and centres of manufacturing. It also plays a great role in mitigating climate change and sustain economic prosperity. In 2015, renewable energy sources to the global energy mix increased to the greatest extent, particularly in the electricity sector as presented by Figure 3 and Figure 4 [IRENA, 2017].

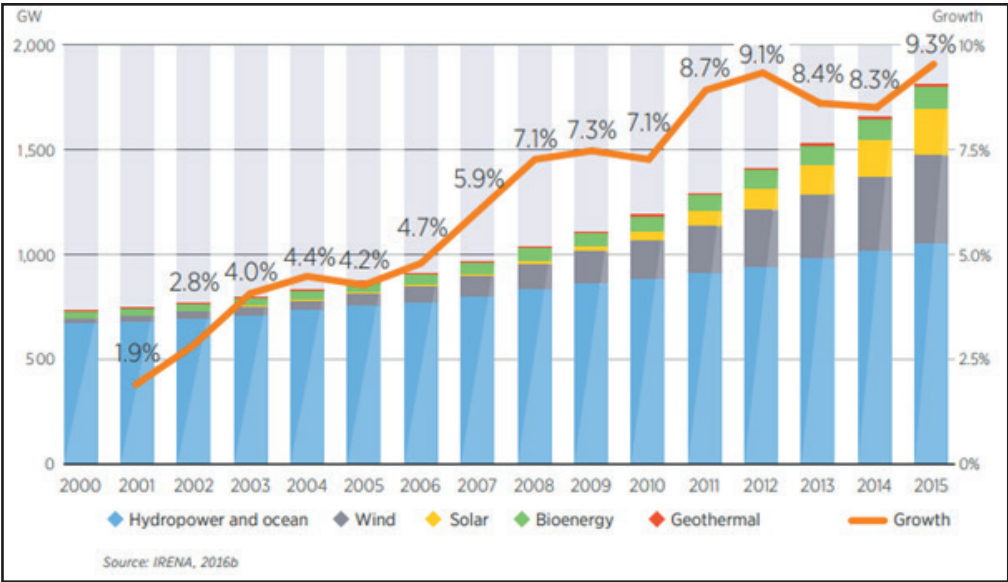


Figure 3: Renewable power capacity and annual growth.rate 2000 – 2015

Source: Cited in IRENA 2017

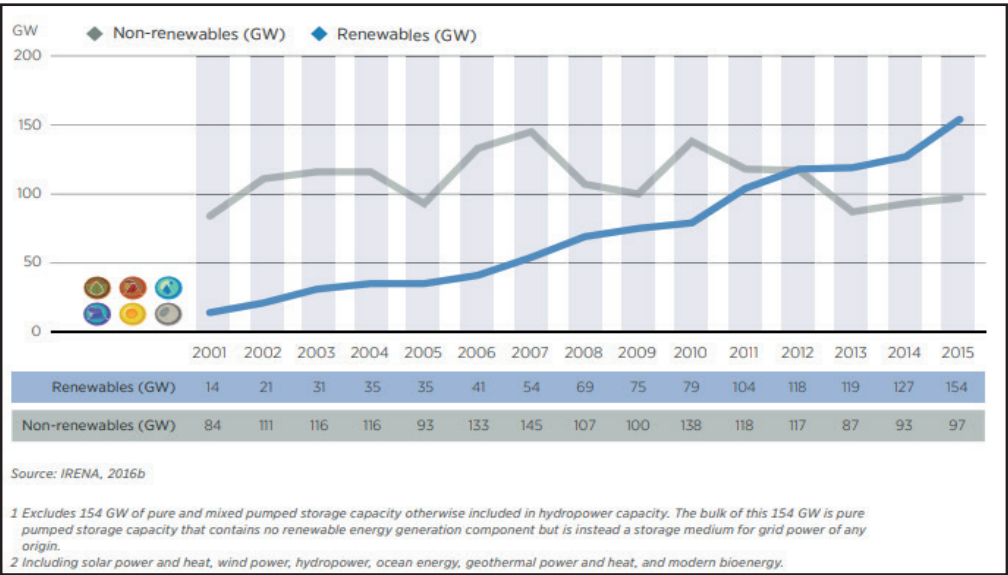


Figure 4: Renewable and nonrenewable power capacity additions 2001 – 2015

Source: Cited in IRENA 2017

Renewable power technologies add a lot to expanding, upgrading and modernising electricity infrastructure on a global scale. In 2015, renewable power contributed to 61% of global power generating capacity, which exceeded 1,811 GW and accounted for more than 28% of global capacity by the end of that year [IRENA, 2016a; IRENA 2016b].

Most energy is produced by hydropower (58%); followed by wind power (23%) and solar power, which has the most rapidly growing share [IRENA, 2016a]

In the electricity production of Hungary pure biomass and mixed biomass and coal are leading. Since 2013 mixed power plants have been increasing production.

At the end of 2013 the capacity of in-built windfarms of non-household size was 324.45 MW which means a stagnation when compared to previous years. The reason lies in the fact that electric powered windfarms of non-household size could only be established by projects, but such projects were not announced.

Electricity production based on biogas, landfill and sewage gases has shown a significant increase in the past few years but in 2013 sewage-gas based production remained steady (a new, sewage-gas based power plant was not installed). However, more landfill-gas-based power plants started operating while the biogas-based production increased due to a greater biogas-use of a power plant.

Despite the unfavourable regulation the production of solar power plants significantly increased.

The non-renewable energy source based electricity production in Hungary is presented by Figure 1.

Over the last few years, as seen in Figure 5, the largest increase seen in the renewable energy sector is observed in solar and wind power plants. This is due to the fact that wind and solar technologies require much lower than investment costs compared to fossil fuels. In 2008 according to IRENA 18.5% of the world's total electricity production came from renewable sources, which has almost doubled over the past period.

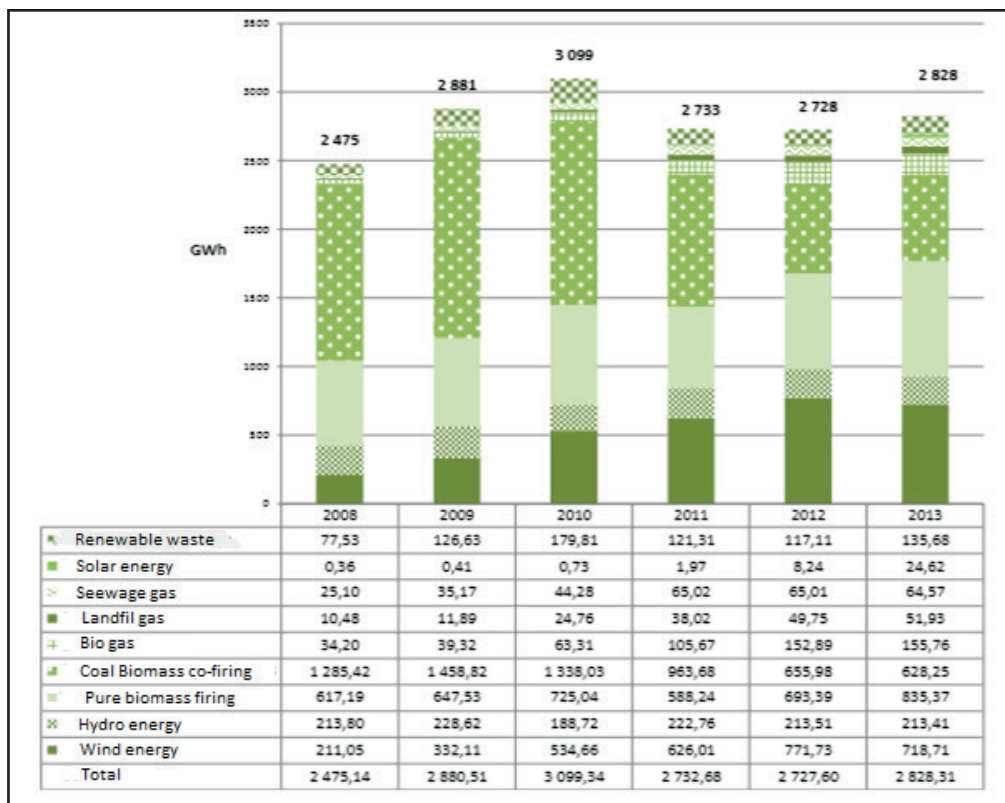


Figure 5 The non-renewable energy source based electricity production in Hungary, 2008-2013 (GWh)

Source: MEKH Parliamentary Report, 2014.

Changes of renewable-based energy production for the main producers

Regarding renewable-based energy sources Europe still has the leading role but in terms of investments China's development is very dynamic. In China the economic growth of 2014 was achieved by reducing CO₂ emission. Curbing coal use and applying more renewable energy sources played a significant role in it. Investments in the USA also grew considerably but changes in the oil price were coupled by uncertainty. In Russia renewable energy sources play a marginal role (Figure 6).

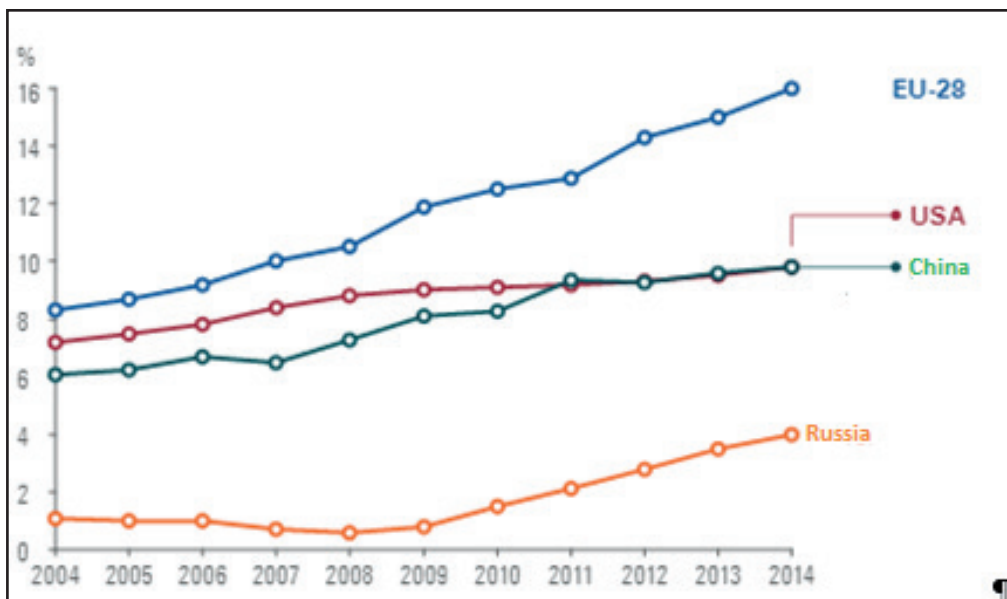


Figure 6 The role of renewable energy sources in final consumption

*Source: Eurostat; Bloomberg; REN21; Enerdata; IRENA;
KPMG estimate in: Szepesi, 2015.*

Changes in competitiveness based on energy prices (EU and USA)

One part of competitiveness can be the energy cost of producing economic added value. The level of energy prices can influence the living standard of the population as it does matter how much the standard bills cost.

The USA energy prices are significantly lower than that of the EU partly due to shale oil and gas production. This can result in the industries with high needs' settling down in the USA.

Real comparison cannot be carried out for China and Russia as these countries do not have a competitive energy market only regulated prices.

Due to its endowments, the USA has always performed better in terms of energy prices than Europe. In 2005 industrial consumer prices in Europe exceeded those of the USA by 46% while household consumer prices were 75% higher than those in the USA.

The situation has dramatically worsened for Europe since then. In 2014 an average European household had to pay nearly two and a half time (235%) more and industrial consumers paid almost double (173%) price for electricity. This backlog in competitiveness has serious impacts on Europe [SZEPESEI 2015].

In the last 15 years, electricity prices for end-users have nearly doubled. One of the reasons for this is subsidizing eco energy according to the law on renewable energy sources (EEG - Erneuerbare Energien Gesetz) whose contribution is continuously increasing.

On the other hand, public utility suppliers do not convey reduced prices to buyers [WUSTMANN 2018].

Opportunities for reaching green objectives

OECD plays a significant role in green strategy. To this end, it published its release entitled Towards Green Growth in 2011. It primarily targeted the governments of developing countries according to which attention to both the economy and the environment would open up new avenues for sustainable development [OECD, 2011].

The publication made the following proposals.

- In order to encourage efficiency and innovation environmental pollution and natural resources should have a priority.
- Activities that damage the environment must not be supported.
- Green innovation must be promoted.
- Investments into hydro-, energy and transport infrastructure must be made.
- Institutional and governmental capacity is required to implement economic and political reforms.

According to OECD (2011) the necessary funds to reach these green objectives would amount to 5 bn US\$ per year.

The two main areas are energy and water. The strategy to implement green economy is complex but environmental measures, financial investments and expenditure, the introduction of green taxes, the importance of creating jobs, the vital role of education as well as innovation and research-development are stressed and ranked as priorities.

A complicated transitory period needs to be completed to reach green economy where innovation plays a vital role (Figure 7).

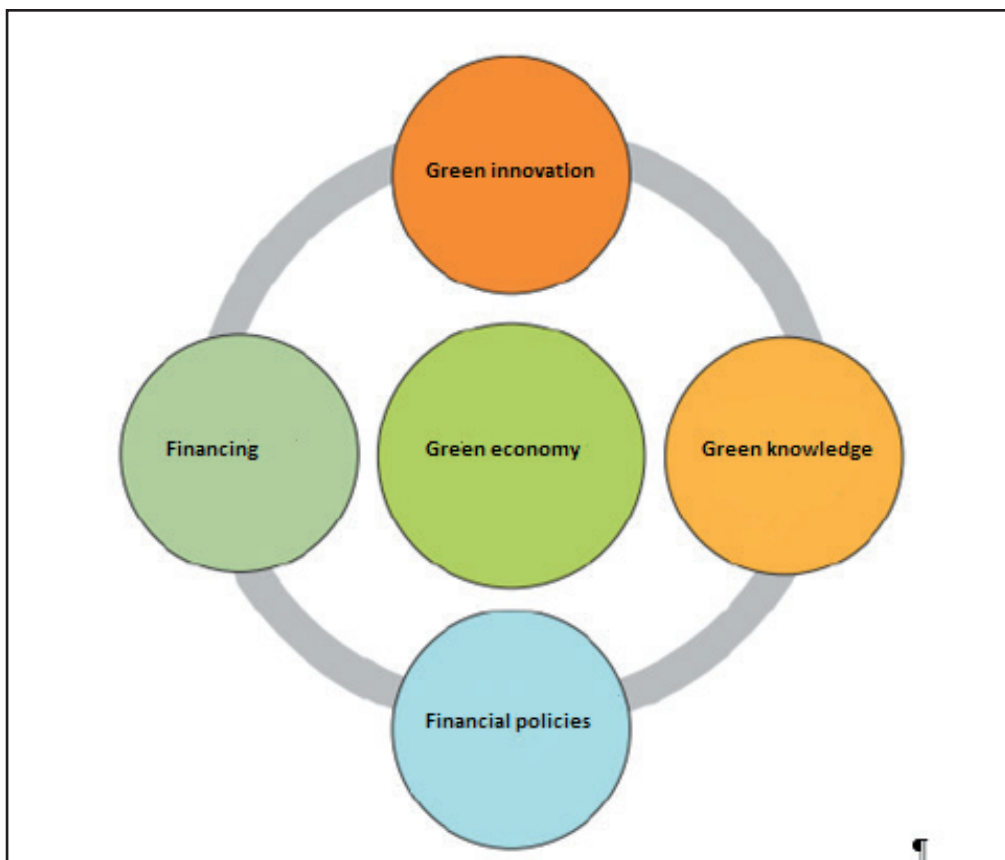


Figure 7 The transitory period leading to green economy

Source: European Environment Agency, 2014, in: KOCSIS, 2014.

The role of green economy in employment

The Environmental Programme of the UN supports the development of green economy [POMÁZI, 2013a]. The World Bank report also writes about the necessary green growth as the patterns applied so far cannot be sustained any more.

The UN, EU and OECD have a pioneering role in working out the methodology and measuring green growth. The objective is to use less energy in achieving synergy between economic growth and environmental protection [POMÁZI – SZABÓ, 2013].

The New Széchenyi Plan (2011) declares an obvious connection between environmental industries (green economy development) and employment as well as the development of small-and medium-sized enterprises.

POMÁZI [2013b] emphasises the role of green economy in employment. The employment package of the European Commission published in April 2012 regards the development of green and energy-efficient economy of vital importance to reduce unemployment throughout Europe. The employment package estimated the job creation potential of the renewable energy sector to be 3 million by 2020 and further 2 million green jobs can be created after implementing energy efficiency measures. The 17% reduction of the total raw material input of the EU's economy can result in 1.4-2.8 million new jobs and recycling the most important materials would result in securing a living for 560 thousand people by 2025. By 2020 more efficient waste management can create jobs for nearly 400 thousand people [EC 2012].

According to IRENA data, by 2017 the number of those employed in the energy industry exceeded 10.3 million as presented by Figure 8 and Figure 9.

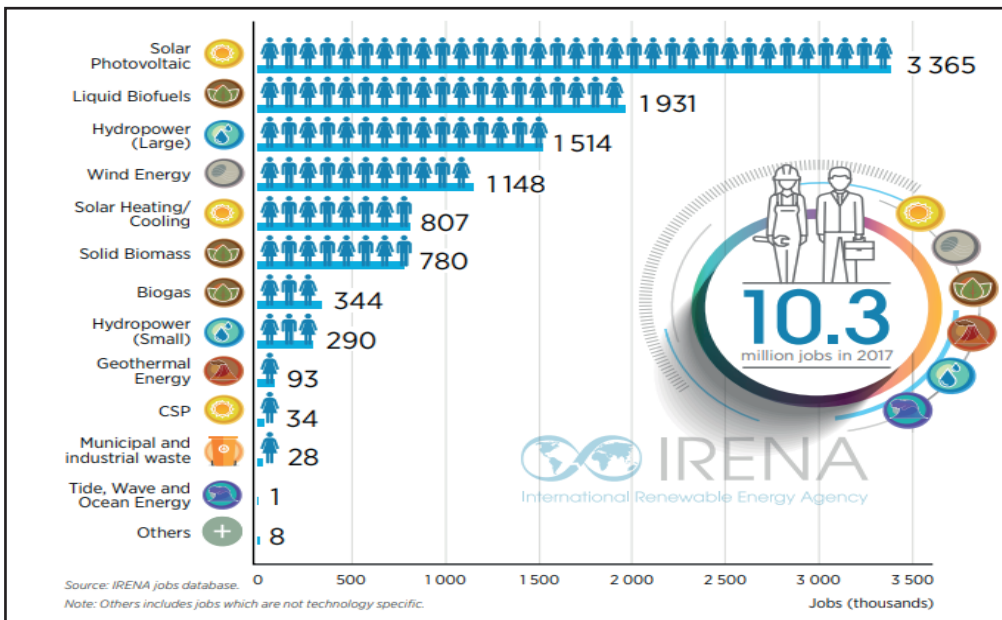


Figure 8 Renewable energy employment by Technology 2016

Source: Renewable Energy and Jobs 2018, IRENA

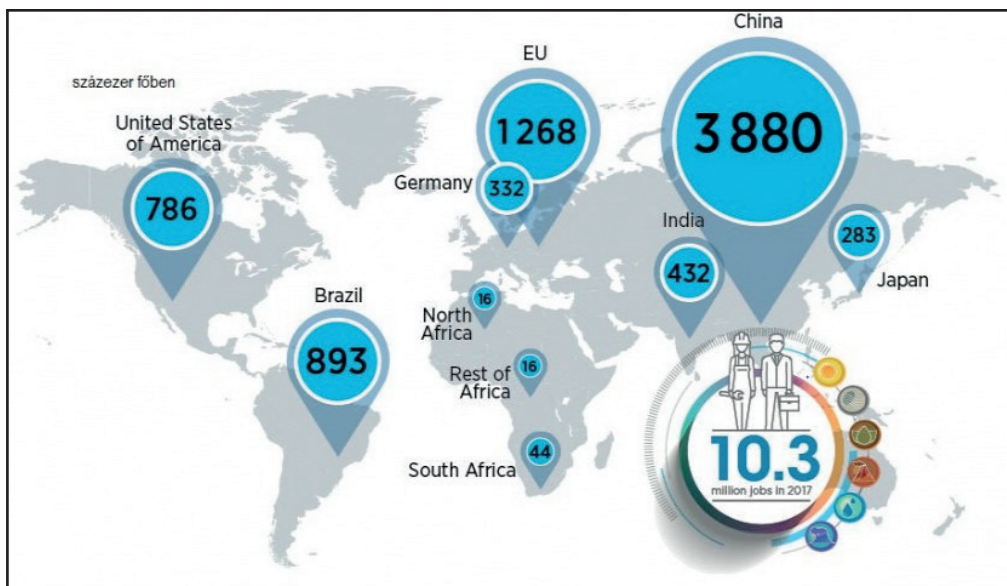


Figure 9 Renewable energy employment in selected countries

Source: IRENA 2018

Environmental industries and waste recycling have great potentials for the future as Figure 7 represents. These opportunities are not utilised at all at present [SZABÓNÉ PAP et al. 2012].

In the future employing semi-skilled or unskilled workforce must also have some results if possible. That is where environmental industries and waste management have some opportunities [MAGDA 2011].

Proper training is essential for the competitive functioning of sustainable economies [TÉGLA – SZÚCS 2015].

The present-day Hungarian employment (in 2018) shows an improving tendency as reflected in Table 4.

Age group	Persons		Rate of unemployment	
	1000 persons	Change in 1000 persons	%	change in %
15-24	291.0	-7.6	28.2	-0.1
25-54	3413.2	48.4	84.1	1.1
55-64	688.9	20.3	53.3	3.0
TOTAL	4393.1	61.1	68.8	1.5
of which 20-64	4367.5	60.8	74.0	1.6

Table 4 Employment in Hungary, 2018

Source: Central Statistical Office, 2018

In 2017, the number of employed persons aged 15 to 24 was 291,000 and the employment rate was 28.2%. The proportion of older workers increased, and the employment rate improved by 1.1%. The employment rate of the 20-64 year-olds defined in the Europa 2020 programme also shows a 1.6% improvement. Green industry can also improve domestic employment.

The green economy can increase employment in several areas. Just to list some of them:

- alternative energy production, biomass use, energy plants,
- hydro, wind, solar, geothermal energy,
- energy storage, insulation,
- waste incineration and use,
- reducing the energy use of vehicles and
- environmental industries.

According to GERGELY – NÉMETHY [2012] renewable energy has a great potential in rural employment, which can be for long term. Of the renewable energy sources the production of solar energy systems (solar panels), heating devices (furnaces, pellets) and certain spare parts (such as turbines) has one of the highest potentials of job creation provided they are produced by Hungarian SMEs. Green jobs can improve the situation of employment in the countryside. According to the Environment Programme of the UN green jobs are such jobs in several industries (including energy supply, recycling, agriculture construction and transportation) that help use energy, raw materials and water, reduce the emission of greenhouse gases, prevent damage from waste and pollution, protect and restore ecosystems and biological diversity [SZŰCS 2016]. The solar energy systems (solar panels) have the greatest job creating potential (Figure 10).

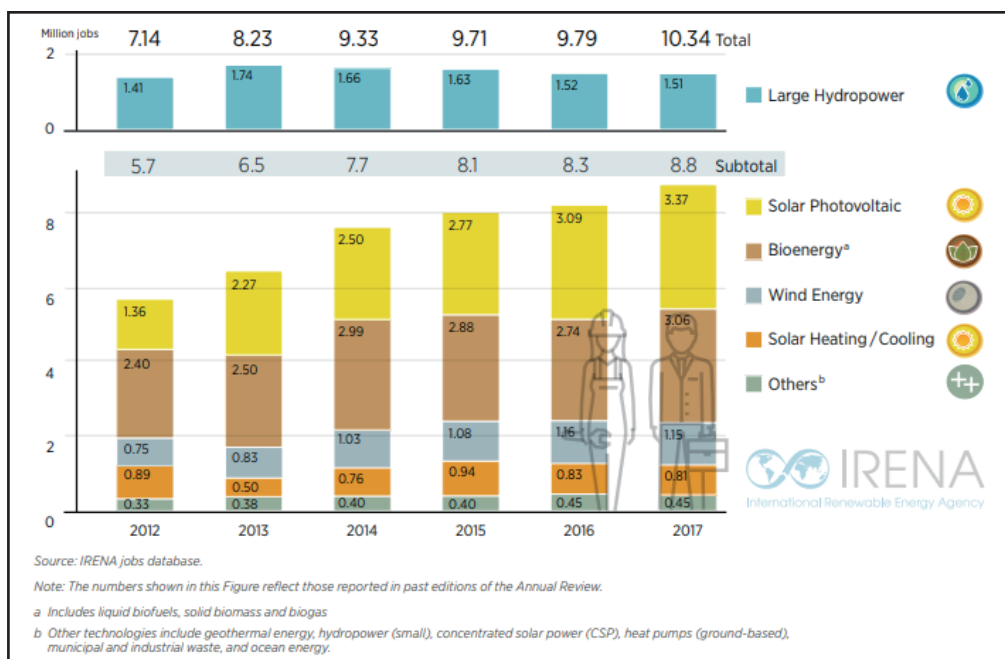


Figure 10 The estimated job creating impact of different energy producing technologies

Source: IRENA, 2018

Conclusions and recommendations

A big challenge of the future is creating sustainability to offset the negative impacts of climate change. In the model to be created a balance must be sought between energy efficiency, savings on energy and sustainability. The energy demand of the world is growing so that is why enhancing the role of renewable energy resources is a must.

This programme can reach its objective by implementing green economy, i.e. developing new green industries as well as meeting the criteria of employment and competitiveness.

Realising the strategy of sustainability calls for measuring changes by indicators which are continuously updated and refined by EUROSTAT.

The CSO publishes its 'Indicators of sustainable development' every second year that contains Hungarian as well as European data. The most recent one is to be published in 2017.

Continuous analysis in certain areas is vital for implementing green economy.

They include the following

- activity resulting in climate change, air pollution
- analysing climate change
- raising temperature and droughts as well as weather extremities
- the qualitative and quantitative use of water
- sustainable land use
- analysing the biosphere and environmental protection including
 - natural stock, biodiversity
 - protected areas,
 - environmental protection and taxed levied for this purpose.

Renewable energy sources are necessary for green economy. The use of biomass takes the leading role but that of solar and wind energy is also getting more important. One opportunity for producing environmental-friendly energy is producing biogas. While processing waste, energy can also be produced, which has not been made use for so far.

By 2020 the use of biofuel must be increased to 10%. Hungary can meet this criterion when taking its domestic production into account.

According to the directive in effect for three years the production of biofuel must cause at least 35% less environmental load than the traditional fuel. This proportion is to be increased to 50% from 2017, whose implementation is quite uncertain or unlikely to be met. Green economy creates several jobs.

To develop green economy and achieve sustainability, the following tasks must be accomplished:

- increasing local energy production,
- producing spare parts for renewable systems,
- decreasing the environmental damaging role of transportation, preference of railway,
- safeguarding natural assets, maintaining biodiversity,
- protecting soil and water bases,
- prevailing the principle of 'the polluter pays'.

On the basis of the above mentioned, green economy can be developing, and a more liveable world can be created.

Summary

‘Green growth’ means an internationally accepted and desirable future. Measuring green growth is possible by means of indicators, which helps assess the situation in a realistic way.

The biggest challenges include:

- climate change,
- loss of biodiversity,
- non-sustainable management of water resources,
- health risks of pollution and chemicals, hazardous waste.

In terms of energy supply a more intense use of renewable energy sources must be accomplished. Preferring local resources makes sustainability possible. Hungary’s data on energy production show curbing on coal, crude oil and natural gas production and the growing role of renewable energy sources in line with making the economy greener. The energy intensity indicator of Hungary (i.e. the relation between energy use and GDP) has becoming more moderate nowadays while the role of water has appreciated. The water supplies of Hungary are suitable for meeting long-term demands.

The National Environmental Protection Programme sets the future trend for developing the economy, which is the following.

- transition to an economy with low CO₂ emission, reducing greenhouse gas emission, reinforcing natural absorption capacities,
- successful adaptation to climate change,
- broadening knowledge on climate change, information on preventive and adaptation measures.

One of the priorities for Hungary is improving employment. It is viable in several areas of green economy including

- alternative energy production, biomass use, energy plants,
- hydro, wind, solar, geothermal energy,
- energy storage, insulation,
- waste incineration and use,
- reducing the energy use of vehicles and
- environmental industries
- educating renewable energies in education
- education of selective waste collection

- setting up green jobs
- promoting equal opportunities in employment
- CSR

Manufacturing equipment and spare parts for renewable energy production is also a great opportunity for employment. Making use of renewable energy sources can be linked to vegetable production in greenhouses and creating new jobs calls for moderate investment. Insulating buildings can also create several jobs.

Taxation can also ease making the economy greener. When levying green taxes, the tax burden is transferred from social and economic benefits (such as employment) to those producing a negative impact (such as environmental pollution). Many would opt for introducing CO₂ tax as the best strategy to offset the changes of climate change.

State and EU grants have a major role to play in the sustainable development of the SME sector, but rethinking support and accurate needs assessment are needed. In the previous research, it was found in the in-depth interviews that small businesses are not able to use the subsidies due to lack of resources, so older or used technologies or machines are used. We consider it necessary to carry out a survey in the Hungarian SME sector.

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