European Environment Agency

Ministry of Agriculture

GLOBAL MEGATRENDS IMPLICATION ON THE ENVIRONMENT OF HUNGARY

SUMMARY OF REPORT

based on EEA's project Mapping Europe's Future: understanding the impacts of global megatrends at the national level

May 2017

Content

1. Foreword

Welcome speech to the expert group members delivered by Minister of State for Environmental Affairs Zsolt V. Németh on 27th of April 2016

Honured Professional Team Members, Honured Ladies and Gentlemen, Dear Friends!

On Earth, 1.8 hectares of land is available to everyone; the ecological footprint of a resident of Hungary is 3.7 hectares. This value shows that we use more resources, and produce more waste than we could do according to the principle of sustainable development. If you like we can say we export our environmental pollution. Of course, we are not at all alone, but it's hardly reassuring. Environmental issues in Hungary are not separated from environmental issues in the world. We are impacting the world, and the world is affecting us.

Not only the problems are renewing, but also our solutions, our way of thinking. It is simply natural for today's young people to think together, to work in teams. As problems are getting more and more complex, so do our thinking and solutions.

There is a great need for dialogues.

Often comes the complaint, that road construction is hindered by protesting "green terrorists". Indeed, because stakeholders did not sit down to clarify and reconcile their interests, there was no conversation. Floodlighting church towers are beautiful things, but we also have to take into account the animals living in church tower, the owls, the bats. All of these are protected, and this is especially important in 2016 when the mammal of the year is the bat.

According to a prominent Hungarian thinker, climate change is not a problem but a great opportunity. It is an opportunity for mankind to learn thinking and acting togeather in a very urgent matter. And if we learn cooperation in the matter of climate change, we can apply methods to other issues like healthcare, education and waste management – or anything.

This project is an experiment for common thinking. We have to think about things that often do not have a fixed government position, limiting mandates. But these are things we see, feel, and experience every day.

Trying to think together is this project. We are collecting opinions and insights, but this time we do not have to come to common view in everything. This time it is enough to record opinions. The results of the project will not be put to a government meeting, but we hope later it will help working together.

An attempt to collaborate is this project, where we came from different places, bringing a wide range of experience and knowledge. And that is why we have a fundamental respect and acceptance of each other - especially if we are thinking in different ways, if opinions are different. This is not the usual, it is not common. It will be hard. But that's why this is exciting.

I sincerely wish you a good job!

2. List of implications of GMTs by importance

as result of export group's discussion

1. **Lessening natural habitats (14 points)**
2. **Extreme weather patterns (floods, droughts) (12 points)**
3. **Health aspects of climate change (premature death, contagious diseases (9 points)**
4. **Growing emission of pollutants (9 points)**
5. **Growing water demands – decreasing potable water assets (9 points)**
6. **Adverse effects of free trade agreements to Hungary (7 points)**
7. **Transformation of natural ecosystems (less native species, more invasive species) (6 points)**
8. **Hungary becomes destination of migration (6 points)**
9. **Deterioration of ecosystem services (5 points)**
10. **Waste management (4 points)**
11. **Soil in quantitative and qualitative danger (3 points)**
12. **+ Alternative energy use gains attention (3 points)**
13. **+ Effective material use gains attention (3 points)**
14. Lessening and ageing society (2 points)
15. Degradation of (surface and groundwater) water bases (2 points)
16. Longer allergic season (2 points)
17. Harmful effects of biologic renewable energy use (2 points)
18. Extreme hydrological events (droughts, floods) (2 points)
19. Growing differences between generations (1 points)
20. ~~R~~unning out of natural resource stocks (1 points)
21. + Research and innovation gains attention (1 points)
22. Hybrid wars (0 points)
23. Basic systems go beyond price (0 points)
24. Overloaded health and social system (ageing society) (0 points)
25. Collapse of pension system (0 points)
26. Extreme political powers gain attention (0 points)
27. Issues of housing estates (energy efficiency, mental hygiene) (0 points)
28. + disadvantages of little settlements drops (0 points)
29. Food supply endangered (e.g. „no maize yields in future") (0 points)
30. + Longer growing season (0 points)
31. Less days with frost (0 points)
32. Pests do not freeze during winter (0 points)
33. Developing countries attract investors (0 points)
34. Degradation of soils (0 points)
35. Vulnerability and lessening of soils (due to urbanism) (0 points)
36. Further invasive species appear (0 points)
37. Weakening little settlements (0 points)
38. Deterioration of air quality (0 points)
39. Growing social and political tensions (0 points)
40. Forest fires become more frequent (0 points)
41. Forest stocks deterioration (0 points)
42. Resistivity of habitats declines (0 points)
43. + Migration of species may alter (e.g. birds), population may rose (0 points)

As number 1 (Lessening natural habitats), number 7 (Transformation of natural ecosystems - less native species, more invasive species) and number 9 (Deterioration of ecosystem services) are rather overlapping, they have been merged (number one).

Later the most important 13 implications have been elaborated on.

3.1. Lessening natural habitats, transforming of natural symbioses degradation of ecosystem-services

For the extension of **linear infrastructure**, especially for road constructions the fragmentation of ecosystems is going on. The area of natural habitats is growing narrow, its quality is degrading. While loosing ecological connections the vulnerability if insulated ecosystems is higher.

Hungary presently is among the areas of European Union's mostly infected by **invasive species** (http://www.mtvsz.hu/fogjunk_ossze_a_talaj_es_a_termofoldeink_vedelmeert ; http://www.parlament.hu/web/fenntarthato-fejlodes-bizottsaga/2016.-november-17-ei-konferencia and https://www.youtube.com/playlist?list=PLOSTWDuus48L_hSkv0tKyA3E8bCFihZRH). An assessment in 2008 () found that the **Natural Capital Index of Hungary is 9,9%**, meaning that 90% of the original ecosystem service is lost. In areas where farmers took seriously the issue of invasive species, the ragweed successfully has been eliminated. In the same time some invasive plants are liked by the apiary, so aims are not always clean.

In Hungary the number of protected species is relatively high, while the rate of protected areas is small. Some think that this fact implies the danger of deterioration.

Natural areas are also endangered by firewood stealing as well.

Knowledge on benefits of **deciduous trees** on to human health is weak. We know that trees absorb CO_2, by which they slow climate change. They produce oxygen, arrest dust, give shadow and vaporize huge amount of water – they influence local climate and human perception too. They have outstanding role in tolerating summer heat wawes and thus in adaptation to climate change.

One of the effects of climate change is that the chance for **forest fire** is growing, and protection becomes more difficult. It not only means environmental damage but also serious human health risk: fume and smoke in the air may cause respiratory illnesses and circulatory diseases.

Many of the habitats depend on agriculture, especially ecological farming offers habitat or nutrient. This is a notable aspect when planning nature conservation in Hungary.

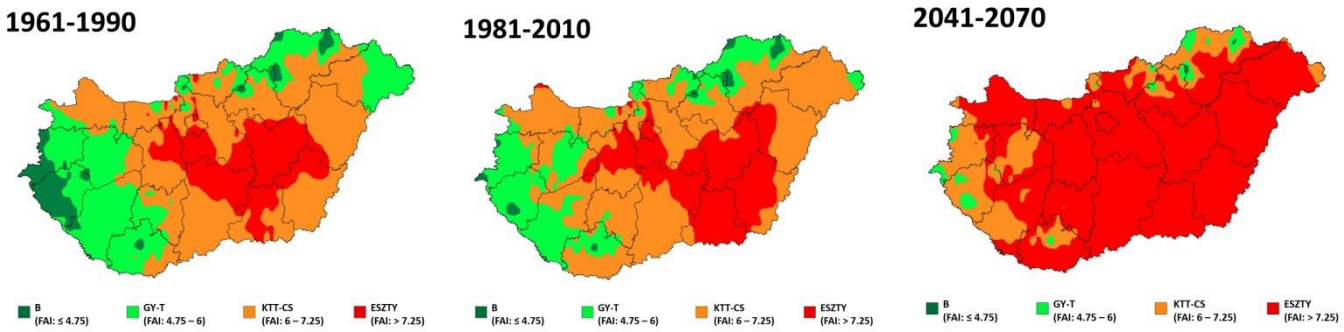
A notable opinion states that natural effect of climate change would be that habitats shift to northward. But as Hungary (in the middle of Carpathian Baisin) is surrounded by mountains, species can not migrate fast enough: ones can not come from South, others can not progress. Extinctions and notable fall in number may occure, leaving a kind of ecological space, and the void can be filled by adaptive invasive species (http://www.unikornis.hu/elet/20160902-szomoru-hogy-mar-csak-magyarorszagon-van-klimaszkepticizmus-urge-vorsatz-diana-klimavaltozas.html).

Others emphasize that the reason of shift of habitats is not only because of the change of temperature but also the change of precipitation zones.

In Hungary two tree species and their adjoining biomes are especially endangered. One is **spruce (picea abies**, lucfenyő), but on the one hand naturally it is not a dominant forest creating tree, and on the other hand it is native only at a few areas in Hungary.

The other endangered tree is **beech (fagus**, bükkfa). It is a native tree in Hungary, and covers great lands. It's lessening or disappearing raises serious questions. One of them is that when land cover is changing the organic material content of the soil also changes, which responds to land cover and also can accelerate soil erosion.

Holding native species over a certain amount of climate change is not possible. We already have areas where it is the fourth year when beeches are planted, but a year later one can find nothing but acacia. As a forester from Western-Danubia worded: "It is not good to have an argument with the nature".



Change of ideal habitats in Hungary (presentation of dr. Attila Borovics in the Ministry of Agriculture 4th May 2017)

B: Beech (Fagus)*;*

GY-T: Hornbeam (Carpinus betulus) – *Common oak (Quercus robur);*

KTT-CS: Sessile oak *(Quercus petraea) – Turkey Oak (Quercus cerris);*

ESZTY: woody steppe

Policies

Policies to refer to are the National Strategy for Biodiversity (A biológiai sokféleség megőrzésének 2015-2020 közötti időszakra szóló nemzeti stratégiája OGY által elfogadott 2015.06.09.pdf), the National Environmental Plan (http://2010-2014.kormany.hu/download/6/c7/11000/Nemzeti%20Term%C3%A9szetv%C3%A9delmi%20Alapterv%20IV.pdf), and the Natura 2000 Action Plan (http://www.termeszetvedelem.hu/_user/browser/File/Natura2000/PAF/PAF_kivonat_%20Magyar.pdf). In March of 2017 the National Lanscape Strategy has been introduced. It is pity that nature conservation did not become common talk, neither basic element of political decisions. Expert group of this project finds that relevant laws are proper in general, but adequate sanctions are missing.

Suggestions:

Expert group of this project finds that territorial planning system needs to be revised.

It is needed to take into account ~~of~~ the rule of trees when facing climate change, especially in urban areas to enhance the respect for green parks and deciduous trees.

It is needed to use economical assessment of ecosystem services in practice.

In the field of nature conservation cooperations with companies and local governments need to be strengthened.

Invasive species can transform ecosystems basically. To prevent that their propagation must be limited – this is always cheaper than restoration afterwards.

Notable parts of authorities being involved into natural habitat protection are not aware of their positive benefits. This shortcoming must be compensated by educations, trainings.

Laws on license for wood-cutting must be harmonizied – including building permissions; good examples form EU member states should be invited.

Natur guardians should be in proper number and with proper authorisation. Sanctions must be more effective.

Solid opinion of the expert group is that no new strategy is needed, but the implementation is weak and should be strengthened. In the same time the building license system shows problems (e.g. in many cases no building permission is issued, the building is finished, and afterwards a maintaining permission is given).

One can find abandoned sites everywhere: their reuse should be helped (referred as brownfield development).

Notable part of investments with environmental and natural implications is tagged as “advantaged project”; this makes following environmental effects more difficult. Some of the expert groups think that environmental information should be accessible in these cases as well.

For nature conservation it is not enough to know ecology. We have to find allies: water management, forestry can work like that. As a leader of a nature conservation organization worded: ten years ago nobody could imagine a project with hunters and policemen, but now these projects show direction.
It is advisable to help communication between national parks.
Due to a survey in 2016 national parks have rather weak relationship with neighbouring citizens; while 80% of supporters of nature conservation come from cities. It is a rising principle that nature conservation has to stretch over the borders of protected areas.
Most of the society is not aware of the magnitude and value of the ecosystem services. Relevant education and information campaigns must start in childhood and must also aim adults – aiming certain jobs and skills.

Good examples:

Barriarfree Sky Agreement

After long cooperation (including e.g. aligment of stork nests) three electricity providers, the ministry responsible for environment protection, and Hungarian Ornithology and Nature Conservation Association has signed the Barrierfree Sky Agreement. Parties have engaged themselves to make steps for preserving protected birds from electric shock and collision with electric wires. Later further firms joined to the agreement. 3446 km of cables have been insulated, 70 km overhead cables have been exchanged to underground cables, and 2724 special tools have been aligned for a better visuality. The first tangibe results were recognized at protected areas, including Hortobágyi National Park.

„Planning network – protecting birds"

Native animal species for nature conservation

Members of EIONET network all agreed that native animal species can have great role in managing land cover, as proven in national parks. Sheep and Hungarian grey cattle has inevitable role in protection of certain areas, especially grassy lands.

Sheeps and Hungaryan grey cattle at national parks (Hortobágy and Bükk)

EDEN tender (European Destination of Excellence)

Experts mentioned the EDEN tender of European Committee as a good example. It covered the issues of water tourism, rural tourism, and was useful disseminating information on biodiversity. When assessing tenders environmental and sustainability aspects were also taken into account.

Nature conservation mamagement plans have been elaborated on 11 nature conservation sites in 2016. They offer proper legal and professional basic for nature conservation activities. As management plans have legal status, all stakeholders gain a long term frame for cooperation.

Nature management plans within and over borders: introduction of new document for Parcul Național Cheile Bicazului-Hășmaș, Romania (http://csikirmdsz.ro/hu/nd/10440/torvenyerore-lep-a-nemzeti-park-integralt-kezelesi-terve)

National Park Products can disseminate nature conservation, ecological farming and healthier lifestyle. The National Park Product trademark offers a quality guarantee for the consumers, meaning that the product cames from the region and has been produced on sustainable way. If one takes any of these products, not only takes a slice from the taste of the region, heritage and tradition, but also contributes to the maintenance of natural values (http://nemzetiparkitermek.hu).

Some National Park Products: sea lavender honey, smoked deer salami, quince jam, fresh cheese with green herbs and sweet dessert wine

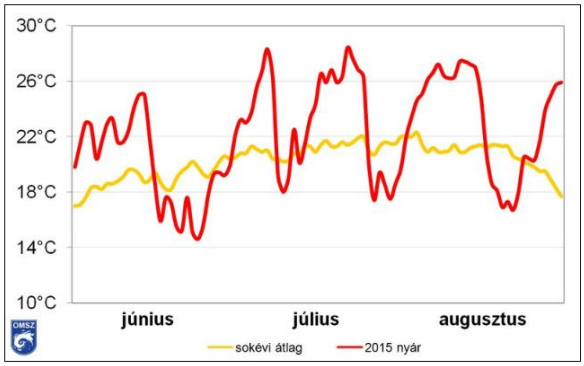
Schoolgardens

One of the ways of teaching about ecosystems is establishing Schoolgardens. Here children (and parents) can directly experience the interdepence of environmental systems. Theese gardens make notable part of the curriculum tangible, and most of the students like and respect plants and animals living with us.

Resource of photo: Foundation for Schoolgardens (Iskolakertekért Alapítvány)

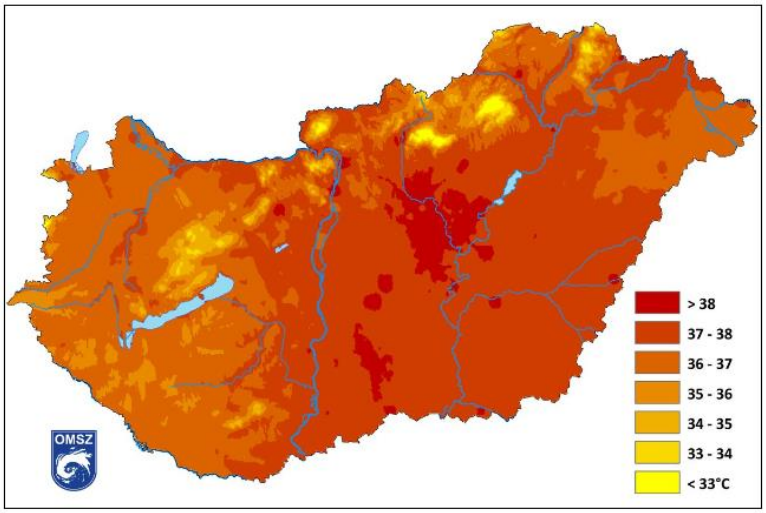
3.2.Extreme weather patterns (floods, droughts)

The summer of 2015 gave a preliminary picture of what to expect in the future. The average temperature of the season was 22.15°C which was 2°C higher than the 1981-2010 average.
Hot, droughty periods were closed by intense percipitation-events with rain-shower, hail and strong winds; followed by returning heatwaves. Temperature of still waters was also unusually warm: on 10th of August Balaton was 29°C at Siófok.



June; July; August 2015
Average of many years; Summer of 2015

In Budapest from the beginning of the last century until the 1980s in average we had 5-6 days with over 25°C daily mean temperature. Between 1981 and 2010 we already had 12 such days, but in 2015 we had 39 such days.
Cities warm over the average: dark surface absorb, and concrete reserves solar enegry. Heat island effect can be recognized in every bigger Hungarian cities. This should be ballanced by tree plantings but in many cities one can see the opposite. Cities are warming, more and more use of air conditioning pushes hot air to the street – vicious circle (http://www.unikornis.hu/elet/20160902-szomoru-hogy-mar-csak-magyarorszagon-van-klimaszkepticizmus-urge-vorsatz-diana-klimavaltozas.html). In 2015 all three summer months were far warmer than the usual. At Körszakál the average temperature was 32,3°C, which is specific for Athens or Madrid.

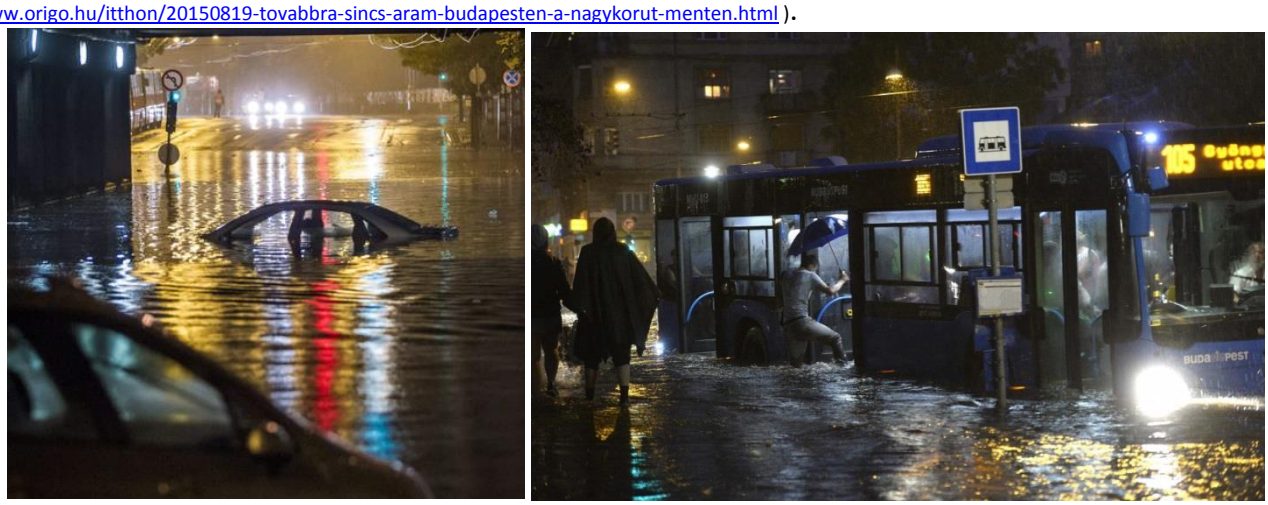


Hottest temperatures registrated on summer of 2015

Percipitation came in hectic temporal and spatial distribution. Seasonal percipitation sum was 130,8 mm in Hungary which is less than 70% of the usual. First two months were especially dry: in June we had only 40% of the usual (29.2 mm). Certain areas faced extreme aridity, for example South-Eastern edge had only 40% of the usual seasonal percipitation.

Expert group advised that due to the change of climatic conditions the mix of cultivated plants also must change. A certain opinion emphasized that due to the hot temperature and decreasing percipitation corn will not be produced in the Carpathian Basin.

Heat waves were closed by intensive hidrometeorological events with extreme rain-showers. The highest daily percipitation has been measured at Tiszaörvény with 120.5 mm. In Budapest the cloud-brust caused serious demages with undermined routes and flooded basements. On 17th of August at Budapest inner city meteorological station 115.4 mm daily percipitation has been registered (http://nol.hu/mozaik/elmosta-a-vihar-budapestet-1557857 ;http://nol.hu/mozaik/beszakadt-az-ut-a-vamhaz-koruton-kaosz-es-zurzavar-a-kozlekedesben-1557947 ; http://www.origo.hu/itthon/20150819-tovabbra-sincs-aram-budapesten-a-nagykorut-menten.html).



Budapest, cloud-brust on 17th of Auguts 2015

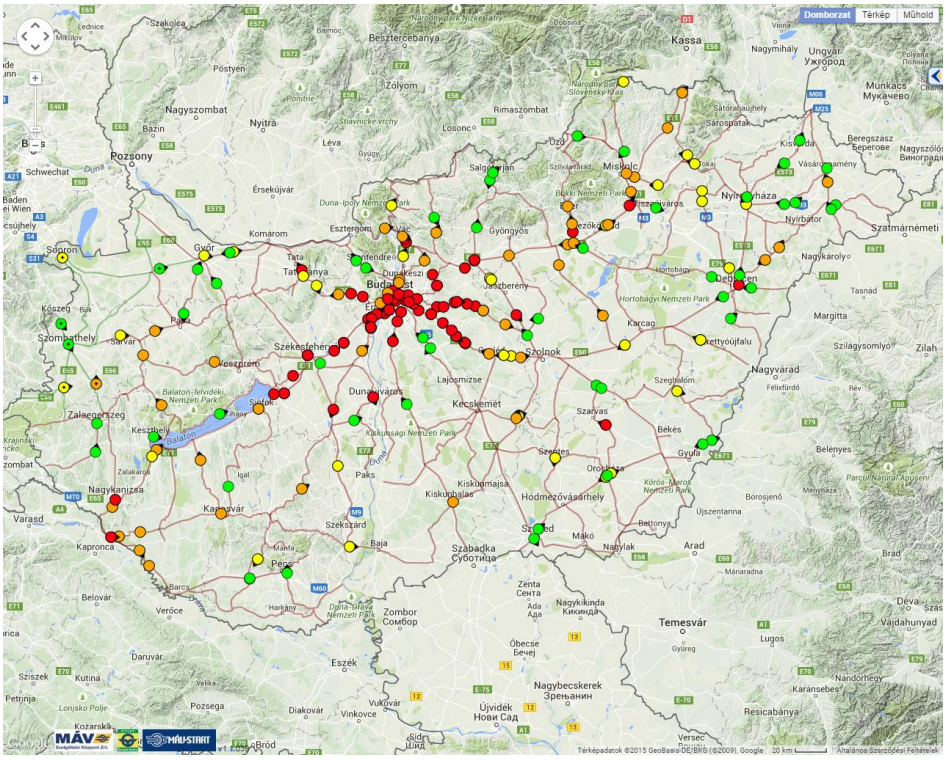
Storms also showed that climatic extremities may endanger traditional infrastructure as well. Just for example: electirc switchboards are usually in the basement of the buildings, thus flash floods or high groundwater can make them vulnarable.

Budapest after the storm: Fővám Square and Hospital at Uzsoki Street (17th August 2015)

Storms closing heat periods showed the strongest winds of the summer: at Aszód 130,7 km/h speed has been registered in July 2015 (http://met.hu/ismeret-tar/erdekessegek_tanulmanyok/index.php?id=1398&hir=Hohullamok_nyara).


Demolition of windstorm: Hárskút, and Budapest (8th of June 2015)

Storms caused delays and stoppages at train transport too: Budapest was kind of blocked by the trees fallen onto the track and overhead wire (http://iho.hu/hir/lecsapott-a-front-150708). Situation was similar at road traffic.

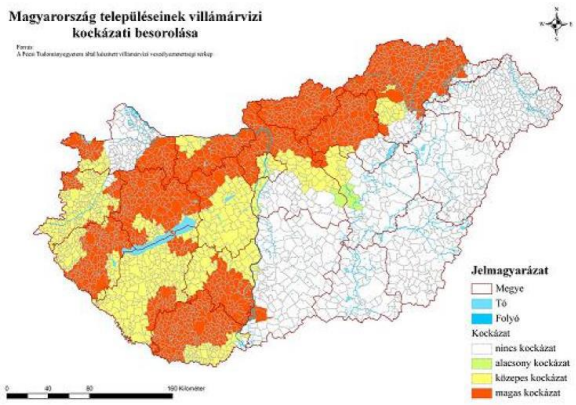


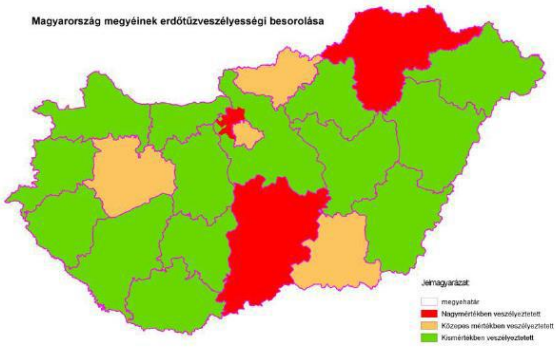
*8th of July 2015: **yellow** **oragne** and **red** circles show trains with delay.*

Recent data show that Hungary has average yearly mean temperature 1.5-2°C higher than had before the industrial revolution. Considering that global average of climate change is +1°C we can state that **Carpathian Basin warms above global average**. February of 2016 was 6°C higher than average February temperature (http://www.unikornis.hu/elet/20160902-szomoru-hogy-mar-csak-magyarorszagon-van-klimaszkepticizmus-urge-vorsatz-diana-klimavaltozas.html).

<u>Relevant information and policies:</u>

- For the implementation of National Climate Change Strategy (Nemzeti Éghajlatváltozási Stratégia) the National Adaptation Spital Information System (NATÉR) has been installed (http://nater.mfgi.hu/).
- A recent document worth to be mentioned: Report on Hungary's National Disaster Risk Assessment Method and its Results (Jelentés Magyarország nemzeti katasztrófakockázat-értékelési módszertanáról és annak eredményeiről, 2014.) (http://www.kormany.hu/download/1/43/00000/tervezet.pdf).





Details of the Report on Hungary's National Disaster Risk Assessment Method and its Results, 2014 Flashflood risk assessment; and Forest fire risk assessment. (Red shows high vulnarability)

Suggestions

- Crops should be prioritazed in agriculture which can live with heat and rought, including selection of species, reconsideration of inland production and consuming, and dissemination of new eating habits
- Reconsideration of green area management of settlements, enhancing plantation of trees
- Dissemination of alternative cooling and shadowing thechniques in contradistinction to air conditioning that needs energy
- Reconsidering dressing codes at work places for the summer months so that cooling requirements could be decreased
- Flash floods may propagate contaminations. Miskolc city, Aggtelek, Balaton-Felvidék area uses karst water – when elaborating water management plans such infections have to taken into account
- Energy providers and transport services should elaborate plans for extreme weather conditions as well as settlements at mountain regions
- Insurance companies must adapt their offers
- Intersectoral cooperations must be enhanced – at national, regional, county and local level
- It is suggested to adopt the updated and disputed version of National Climate Change Strategy (Nemzeti Éghajlatváltozási Stratégia) as soon as possible (beeing at inter ministerial cross-check at the time).

Positive examples

Alliance of Climate-proof Settlements (Klímabarát Települések Szövetsége) embrances settlements, that make steps against the causes and effects of climate change (www.klimabarat.hu). Their homepage is a great collection of tangible good examples that are feasible also at local level. News embraces buildings energetic issues, renewal of street-lighting, education, and many others.

One of the good examples: „Plant a tree for all babies” (http://pozitivnap.hu/belfold/minden-szuletendo-gyermeknek-ultessunk-egy-fat-megmozdult-az-orszag-kepek)

Trainings for enhancing adaptation for climate change

It was a one year long project titled „Climate Answer” that aimed to prepare leaders of settlements for inevitable effects of climate change (http://energiaklub.hu/projekt/klimavalasz-kepzesek-az-eghajlatvaltozashoz-valo-alkalmazkodas-elosegitesere-helyi-szinten-3751). More than 140 leades got a greatly comprehensive picture of duties and possibilities. At the end of the workshop participants are able to prioritize needs, and draft local clima strategy, and even to use available financial founds.

„Climate Answer” training in Budapest: logo, groupwork, detail from an educational film

Green roof can keep homes warm in winter, and cool in summer. It makes air more vaporous, absorbs CO_2 and dust, gives oxygen. And last but not least: looks great (http://www.zoldtetoepites.hu/ http://www.magyarepitestechnika.hu/index.php/2014-2-3/1685-extenziv-zoeldteto-a-maganhazakon-divatos-hobort-vagy-tudatos-epitkezes http://zeosz.hu/extenziv-zoldtetok/)

Extensive and intensive green roofs in Budapest

More and more settlements elaborate their **Climate Strategy**. Elaboration of SWOT analysis is helped by the Settlement Adaptation Barometer (Települési Alkalmazkodási Barométer). Further help is offered by the Geological and Geophysical Institute of Hungary (Magyar Földtani és Geofizikai Intézet).

3.3.Health aspects of climate change

Due to estimation of WHO in Hungary some 16% of the helath loads comes from environmental elements (Country profiles of Environmental Burden of Disease, WHO 2009). These health impacts usually come on low levels but long term, and health changes are summarization of many impacts.

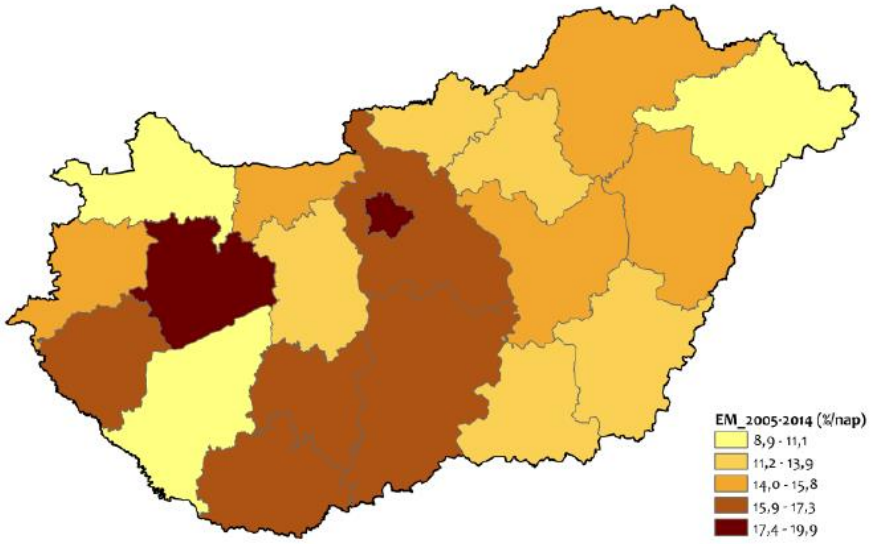
In heath wave the most vulnerables are children and those in following deseases:

- Diabetes mellitus and other metabolism diseases,
- Organic mental diseases, dementia, Alzheimer's disease,
- Mental behaviar disorders, psichoactive medication, alcoholism,
- Schizophrenia and similar disease patterns,
- Extrapiramidal and other kinetic disorders (Parkinson's disease) etc.
- Heart and circular diseases, high blood preasure, arrhythmia,
- Respiratory diseases (KALB, bronchitis),
- Kidney problems, e.g. kidney stone

Young ones (0-14 years olds) are also endangered. New borns are especially in risk, as they have weak temperature regulation and increased need for water. Expectant mothers are also to be mentioned, as their hormonal changes may cause overheating.
Though most of the victims of heatwaves are over 65, it is notable that young and healthy ones are also endangered if they do not take seriously the effects of high temperature.
Geographically the issue affects especially

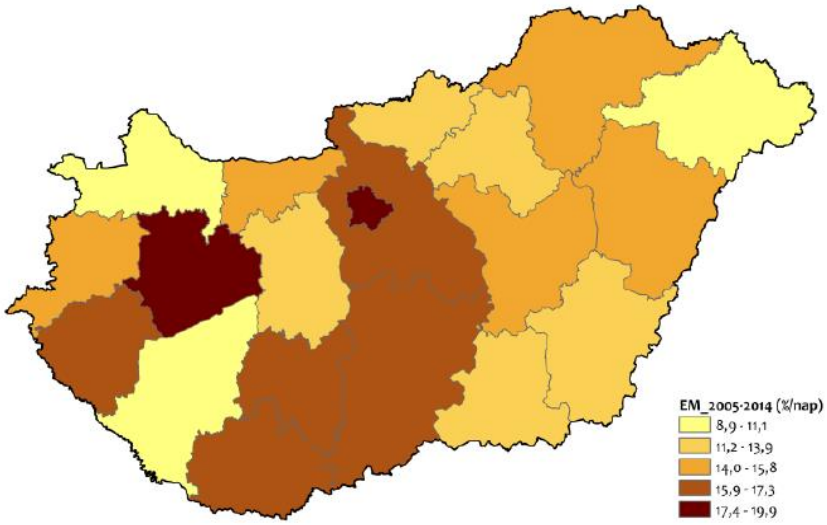
- cities (due to heat island symptom);
- desertificating areas (lowlands, especially Kiskunság);
- those living at farmsteads (tanya).

Certain medicins notably affect regulation of temperature and/ or water exchange. If taking more medicins paralelly, peculiar attention must be payed on summer days.
In EU countires 1 C˚ temperature rise grows mortality by 4%, meaning that mortality coming form temperature may be some 30,000 per year by 2030 and 50,000-100,000 by 2080 (http://peseta.jrc.ec.europa.eu/docs/Agricullture.htm).
Heatwaves reach Hungary more and more often. Between 1992 and 2000 we had six heatwaves, causing extra mortality between 125 and 52% (https://www.antsz.hu/data/cms40724/Paldy_Heat_waves_Springer_book2005.pdf). Between 2001 and 2009 we faced 20 heatwaves with extra mortality between 17% and 32%. Between 2010 and 2015 also 20 hetawaves came. In the last 10 years during heatwaves some 16% extra mortality has been noted, with 22% extra mortality in Budapest (http://www.met.hu/KRITeR/hu/kezdo/).



Extra mortality (%) during heatwaves by counties between 2005 and 2014 in summer period
(1st May – 30 September) resource: KITéR report 2015(http://www.met.hu/KRITeR/hu/kezdo/)

It is forecast to have more and more heatwaves, and, they tend to be even warmer, due to climate change. This can rise extra mortality caused by heatwave by 150% in average. Between 2071 and 2100, based on recent socio-economic conditions, climate change may rise recent extra mortality about seven times.

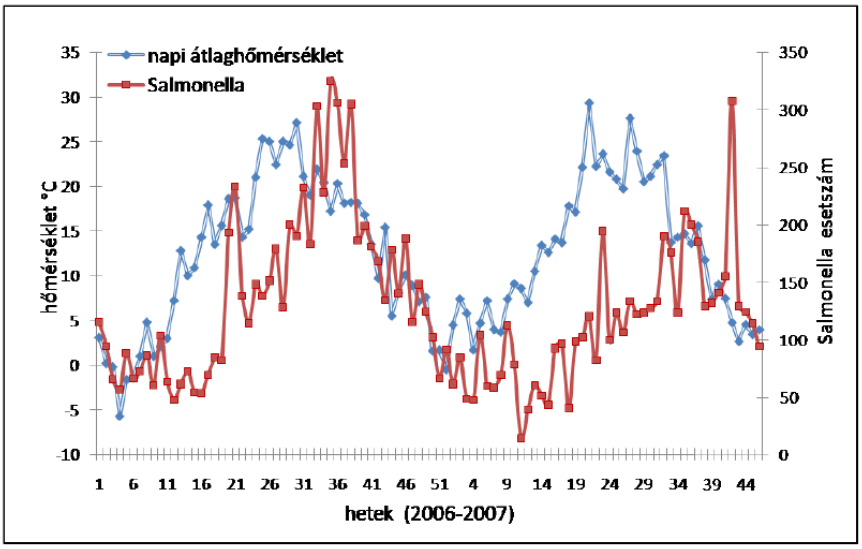


Forecast extra mortality growth (%) between 2021 and 2050
compared to recent period, by counties. Resource: KITéR report 2015 (http://www.met.hu/KRITeR/hu/kezdo/)

The problem can be mitigated. One way is dissemination: population should be informed about what and how much to drink, how to shadow, how to insulate. Other way is to have climate system for buildings – possibly by using renewal energy. First hospitals and elderly homes should be equiped with climate systems, but in middle term this should be extended to homes and workplaces. In many countries the rate of buildings with air conditioning system is much higher.

Adjoining to the issue of heatwaves so called „summer type smog" may occur more often. The meteorological conditions that cause heatwave may cause degradation of air quality, with higher ground-level ozone and particulate matter concentrations (Páldy A, Bobvos J, Apatini D. és mtsa: A 2007. év néhány, az időjárás változékonysága szempontjából jelentősebb esemény környezetegészségügyi értékelése. Éghajlati és agrometeorológiai tanulmányok 10. Országos Meteorológiai Szolgálat Éghajlati Osztály, Budapest 2008, 63-77.).

Higher temperature is in close connections with the number of infections.



***Weakly mean temperature** and **weakly number of salmonella infections** in Hungary 2006-2007*

Resource: Országos Epidemiológiai Központ

New contagious diseases

Due to climate change diseases propagated by arthropods and rodents, and contaminations transmitted by food-stuff and water, may become more often. A vector-monitoring system could observe trends, but expert group thinks that not enough experts, entomologogist are available.

Monitoring of **allergenic plants**' pollens used to start in February, but in recent years it is needed all year around. Allergenic diseases, like hayfever is expected to be more frequent. Higher concentration of CO_2 in atmosphere enhances the vegetation of ragweed (http://hvg.hu/itthon/20160722_parlagfu_foldmuvelesugyi_miniszterium_allergia_kelen_andrasne_parlagfupollen_no_egyesulet). Hypersensitivity to biological allergenics, first of all to ragweed affects 1.2 million people in Hungary.

Climate change directly affects the health system as well. Electric power failure, transport difficulties may also occur; measures must consider patients, those who work for healty system, including medicine supplier system. Dissemination of information on heatwaves is also inevitable. In a recent research 80-90% of respondents think that the state will help tackling the problems of heatwaves. In general in Western Europe public institutions are air conditioned, while in Eastern countires of the continent decision makers do not react to the issue.

Relevant policies

Parliament has passed National Climate Change Strategy in 2008. When elaborating this document, the updating of the Strategy is going on.

Suggestions:

- Law should require that institutions should have heatwave plan that includes labour safety regulation.
- Middle and long term settlement development strategies must detail enhancement of adaptation.
- Every health and social system should be more resilient. Institutions should be prepared for extreme situations, including energy provision. Measures of health system must consider patients, those who work for healty system, including medicine supplier system. Doctors, especially practitioners (háziorvos), health visitors (védőnő), ambulance staff and pharmacists must be

updated and informed for meeting all requirements of vulnerable groups (expectant mothers, newborn babies, ones with certain diseases and taking certain medicins).
First aid system should be widened.

- Methods for detecting new diseases must be developed; vaccination must be perepared.
- Climatization of buildings should be done on a ballanced way: on the one hand it needs energy, on the other hand it warms the outside. Other measures like shadowing, insulation, proper ventilation, and settlement level strategies also should be taken into consideration including the increasing of active foliage, modification of building rules and urban strategies.
- Proper houshold heating (firing) is also relevant; it must be disseminated and controlled (http://www.futsokosankampany.hu/). Open air fires, including stubble firing and firing leaf-litter in gardens shoulc be limited.

Good examples:

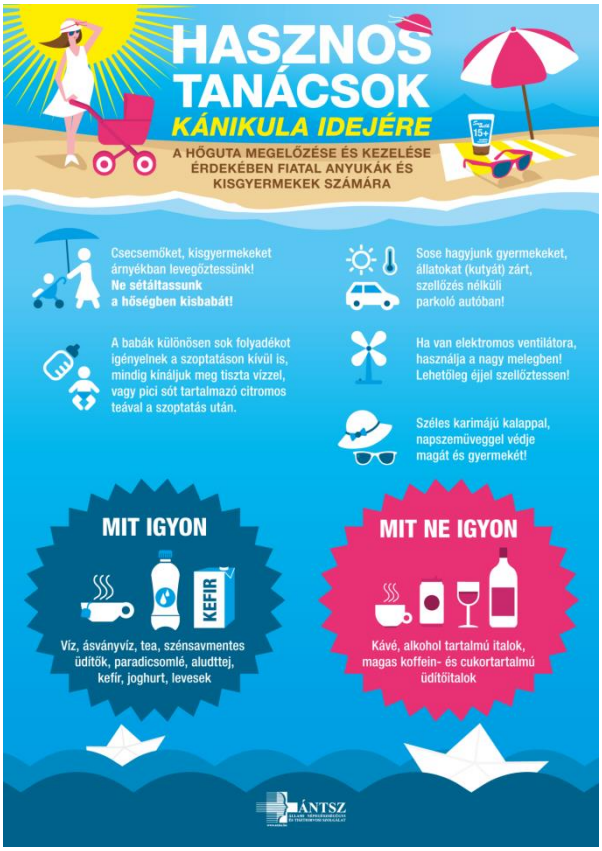
UV alarm

However regeneration of ozone layer is going on, diseases caused by UV radiation still occur. National Meteorology Service (Országos Meteorológiai Szolgálat) informs about actual UV levels and the one forecast for the following day.

Pollen information system and forecast

Pollen concentration is monitored at 19 stations in Hungary. Data show that most of the problems come from agriculture: not properly or neglected plowed fields, and their edges. The system is presently extended and integrated to neighbouring countires. Data are published online too (www.antsz.hu ; www.polleninfo. and org https://www.pollendiary.com/Phd/hu/start).

Heat alarm (Hőségriadó) has been elaborated in 2005, and since that it has been needed for 1-5 cases. All alarm reaches wide groups of people via written and electronic media, besides direct information of health-, and social systems, local governments and involved authorities.



Useful advices for young mothers and their children for the time of heathwaves (leaflet)

Buildings' energetic efficiency improvement

Within the frame of Green Investment System (Zöld Beruházási Rendszer) several tenders have been published, prioritizing complex developments (e.g. insulation with heating system modernization involving renewal energies).

In-house aid system

The informatic system wich provides help and attendance for vulnerable ones in their own home may gain greater role in connection with climate change. When help is requested, the social worker on duty goes to site, and solves problem or asks for further help. The system offers a greater sense of safety. (http://www.szocialisgondozas.hu/szolgaltatasok/jelzorendszeres-hazi-segitsegnyujtas-szt-65%C2%A7/)

3.4. Growing emission of air pollutants

In the EU and in Hungary most of environmental illnesses come from air pollution. In 2013 in Hungary 84% of environmental illnesses came from outdoor air pollution ((129,169), and most of that (94%) was caused by particulate matter (121,677). It resulted in 69% in circulatory illnesses (84,000), 27% in cancer (33,032), more than 2% in chronic respiratory illnesses (2714) and 1,6% in others, mainly lower respiratory illnesses (1926) (Institute for Health Metrics and Evaluation, 2013). **Particulate matter** worth special note.

Smog Alert!

In most of Hungary particulate matter pollution is at least the double of health limit, but at some areas it is over the fourfold of that. Recent situation is a result of cold weather without winds, and pollution by heating. Alteration for the better is not expected in short term.

22nd of January 2017 (https://www.facebook.com/levego/posts/1734755093208706:0)

Due to calculations in Hungary in 2005 7997-, while in 2010 4730 extra mortality was caused by the $PM_{2,5}$ pollution over 10 µg/m^3 level. If yearly mean pollution level could be decreased to 10 µg/m^3 then the lifetime benefit could be between 2,4 months (Pécs city) and 12,8 months (Várpalota city) (http://egeszsegtudomany.higienikus.hu/cikk/2014-3/Bobvos.pdf).

In January of 2017 at North-East counties particulate matter pollution showed the highest levels ever recorded, but other areas reported similarly terrifying data. This urges immediate measures, and also shows that main resource of air pollution is not industry or transport any more but household heating. Firing waste has mostly social reasons, while members of expert group emphasized that in certain cases it was tha lack of waste transfer.

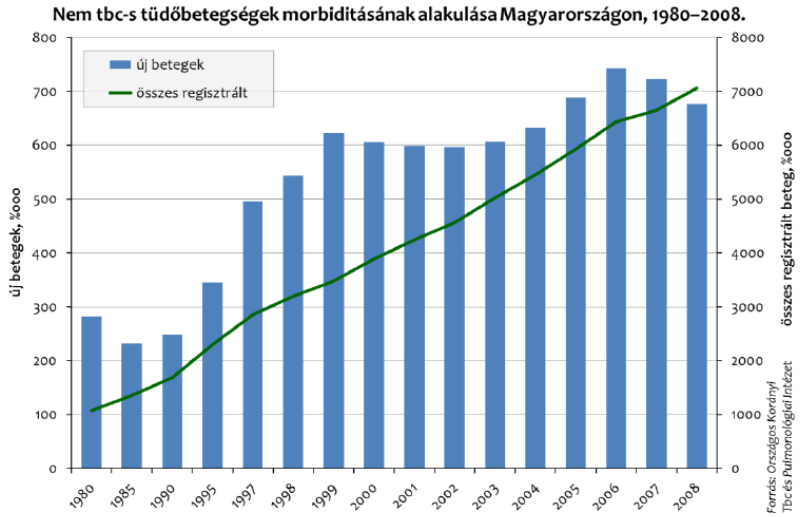
Using lignite for household heating causes serious problems, as this results pollution five times higher than of biomass. The aim would be that lignite should not be available for household heating.

National Energy Strategy 2030 (http://2010-2014.kormany.hu/download/4/f8/70000/Nemzeti%20Energiastrat%C3%A9gia%202030%20teljes%20v%C3%A1ltozat.pdf) and National Buildings' Energetic Strategy (http://www.kormany.hu/download/d/85/40000/Nemzeti%20E%CC%81pu%CC%88letenergetikai%20Strate%CC%81gia%20150225.pdf) were considered by the expert group as progressive ones, and achieving aim data is obligatory. In the same time it is something to consider that the ones with limited financial possibilities can not apply for relevant subsidies and tenders. For bigger energetic developments only credits are available.

For longer term planning of district-heating comprehensive action plan is needed. Shrinking or breaking off the systems would raise notable questions on air quality.

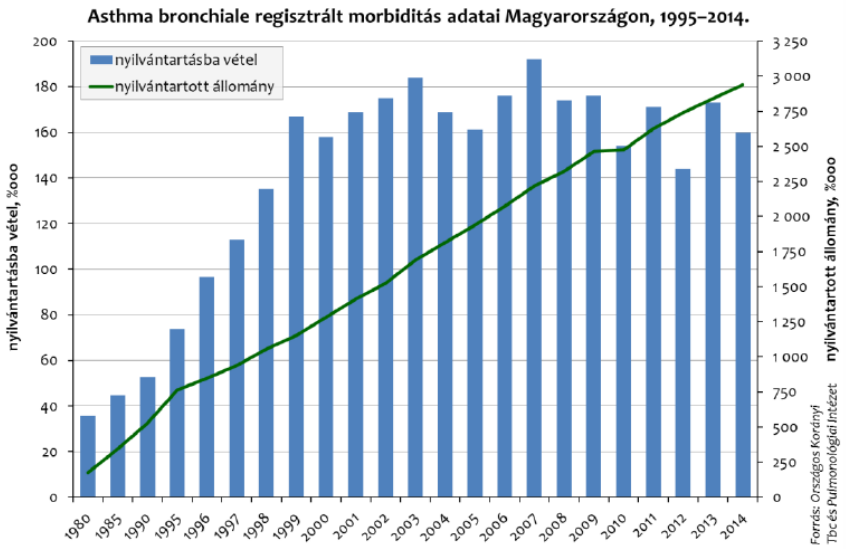
It is seldom mentioned however, that indoor air quality is also important. (http://kreativlakas.com/hasznos-artalmas/lakasunk-levegoje-belteri-legszennyezes-okai/ and http://www.legszennyezes.hu/kozerthetoen-belteri-legszennyezettsegrol/).

Number of pulmonary diseases (apart from tuberculosis) is growing since the beginning of 1990s, and in 2008 it was over 7000 cases within 100,000 heads.



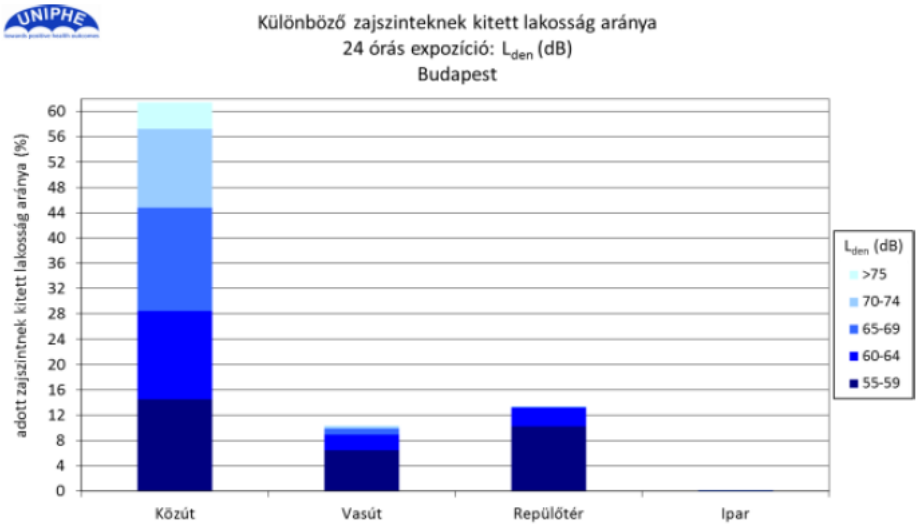
Morbidity of pulmonary diseases in Hungary (apart from tuberculosis) between 1980and 2008

Morbidity of *asthma bronchiale* was 35,7/100,000 heads in 1980, and grew to 167/100,000 heads by 1999, since then it is between 145-192/100,000 heads. Some 60% of new asthma cases have allergic origin (2014).



Registrated morbidity of asthma bronchiale in Hungary, 1995-2014

Light pollution and **noise pollution** (and its social and economic effects) deserves separate note. Notable part of population is exposed to high noise level, mostly origined form road traffic.



Rate (%) of population exposed to different levels of noise in Budapest: road traffic, rail, airport, industry

Suggestions:

- Educating proper household firing for heating, emphasizing dangers of improper firing.
- Limiting firing green waste, promoting composting.
- For absorbing particulate matter tree planting programs among busy routes.
- Watering routes during dusty periods.
- Informing residents on effects of open air and indoor air pollution, and on possible measures: plants, proper ventilation, indoor plants that clean air, regular cleaning of bed linen etc.
- Spuring regular control of chimnies, stoves and boylers.
- Convincing doctors, practitioners, paediatrists, social workers and veterinaries to inform population on possible effects of air pollution, especialy in case of the above listed vulnerability groups.
- Social programs in target groups for replacement of improper firing.
- Energy efficiency programs targeted for those groups of the society who have lower income.
- Updating road vehicles for less pollutin.
- Propagation of marketing second hand articles (clothes, toys etc.) for avoiding health harming effects coming from chemical compounds of new ones.
- Rationalizing public lighting, omiting redundant floodlight of sights during night hours for decreasing light pollution.
- Propagating walking and bicycling, offfering proper infrastructure.
- Enhancing sustainable travel modes – possibly together, e.g. bike renting facilities at public transport nodes, bicycle carrying possibility on public vehicles.
- Due to the opinion of the expert group for the longer term planning of district-heating comprehensive action plan is needed.
- Deployment of plants, especially in cities.
- Fostering school-garden movement.
- Advancing and supporting urban gardening movements.
- Propagating room plants that diminish air pollution, enhancing establishment of green walls.





Good examples:

„Fire smartly!" campaign

The „Fire smartly!" (Fűts okosan!) campaign is based on the fact that 65.5% of particulate matter emission comes from households, mostly from heating firing. „It does count what and how is fired." Campaign uses diverse communication channels for call attention on „hot" issues: what shall be fired and how. Tips and suggestions are collected for minimizing harmful effects to our environment and our health, and for lessening costs (http://www.futsokosankampany.hu and http://www.kormany.hu/hu/foldmuvelesugyi-miniszterium/kornyezetugyert-agrarfejlesztesert-es-hungarikumokert-felelos-allamtitkarsag/hirek/2016-ban-is-folytatodik-a-futs-okosan-tarsadalmi-celu-kampany) .

Leaflet of the „Fire smartly!" campaign

Vehicles run by renewable energies mean much less load for their environment than their ancestors. For example in Zalaegerszeg city buses work that are run by biogas generated from sewage sludge (http://zoldtech.hu/cikkek/20131219-biogazuzemu-autobuszok-Zalaegerszeg).

Direct effect of bicycle transport to air quality is not significant. In the same time its indirect effects are important: if all those who now pedal their bike would want to drive car that would paralyze the life of the city. Infrastructural developments and campaigns for popularizing **active travel modes** are definitely to be followed.

Indoor air quality can be advanced by certain plants; certain types are especially suggested for offices, bedrooms. Hungarian enterprise deploys plantwalls into offices that not only improves indoor air quality but also the health of those who work there. One square meter surface of leaves can evaporate 15-250g water in one hour, can product 8 litres of oxigen daily, and absorbs 1kg pollutants from air yearly (http://grofie.hu/).

Plantwall for better quality of indoor air *(Resource: Gofire* http://grofie.hu/)

6.5. Growing water demands – decreasing potable water assets

About our water stoks (based on Catchment area Management Plan)

In Hungary water stock is almost 12,000 m^3/capita/year (118 km^3/10 million), which is one of the highest on continent. But after considering the runoff, we have about 600 m^3/capita/year to manage.

Territorial distribution of water bases is uneven, likewise the distribution in time. Drought appers mostly in the middle of the Great Plain (Alföld), where evaporation often passes overthe quantity of precipitation.

European and Hungarian reseraches state that climate change is likely to modify the quality and quantity of water stocks. Climate of Hungary is likely to shift towards mediterranian one, with higher yearly mean temperature, with less precipitation during summer, with higher evaporation, thus with less surface runoff and eluviation to underground water bases. Besides, number and intensity of extreme weather events are likely to increase, thus risk of flash floods will rise. These events may have negative effects on the quality of surface waters, causing notable ecological harm.

Almost half of Hungary (44.5 thousand km^2) is lowland, notable part is low without proper runoff. More than 20 thousand km^2 is exposed to flood, with about 5610 km^2 at Danube catchmant area, and 15641 km^2 at Tisza and its tributaries' catchmant area.

Measures for food management and drought management are of national importance in Hungary, but appear especially at Great Plain (Alföld). At certain areas between Danube and Tisza (Duna—Tisza köze) level of groundwater has dropped some 10 meters in last years, that means that trees of the forests can not reach wet areas any more.

About water use (based on Catchmant area Management Plan 5.1 capter)

Household water demands are forecasted to grow (0.6 – 5.4%). Industrial needs have decreased between 2000 and 2013 with 62%; mostly in conversion of timber, printing industry and constructional engineering, while less at metal works, chemistry and food industry. Until 2021 a minor dicrease is forecast for water demands.

Water demands are forecast to diminish until 2021 (with 12-21%). Water use in agriculture (300-400 million m^3per year) is distributed as some one third to irrigation and two third to fish farms. Hungary has

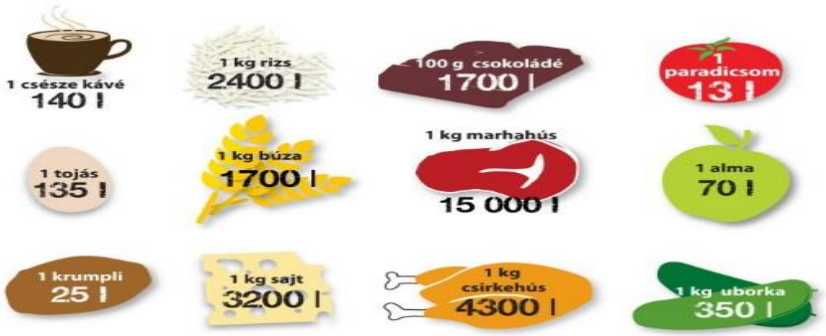
some 400 water farms on some 25 thousand hectares. In this aspect since 2000 areas are growing while total water need shows lessening.

Some 57% of cultivated lands that can be irrigated are in fact irrigated. Forecast state that this rate is to grow. Governmental programs are to offer subsidy for this, but definitely together with efficiency measures. In short term notable increase in water needs are likely.

The expert group of the project emphasized that opening of anabranches is suggested for water management and also for ecosistem considerations. It was also stated that for irrigation only the surface waters should be used, but NOT the groundwater bases. Groundwater bases should be vindicated for human needs.

Water footprint of certain foods may be surprising:

- Water footprint of chicken meat is 4325 m3 water/ tons of livestock, and 3265 m^3 water /tons of egg (http://genmegorzes.hu/baromfitenyésztés-világtendenciái.html).
- While producing one kilogram beef some 27 kg CO_2 is emitted, and depending on the site of the farm some 13,000 – 66,000 liter of water is needed (Meatless Monday – by knife and fork against climate change. www.fna.hu/mitehetsz/husmentesgetfo).



Indirect water demands. *(Resource: Eco-footprint: Water footprint* http://husmenteshetfo.hu/index.php/hu/segitunk/labnyomok*)*

Water energyis planned to be exploited by minor power plants at the already existing dams, and by turbines deployed into riverbeds. Nitrogen pollution (after its peak of livestock and ferilizer use in first years of 1990s) has decreased and is stagnating. Pesticides from agricutlure are also notable (http://web.okir.hu/hu/cikk/354/Felszin_alatti_vizek_minosege_szennyezoforrasok).

Relevant policies

- Jenő Kvassay Plan (Kvassay Jenő Nemzeti Vízstratégia http://www.vizugy.hu/index.php?module=content&programelemid=142 and Kvassay Jenő Terv tájékoztatás és társadalmi konzultáció http://www.vizugy.hu/index.php?module=vizstrat&programelemid=143)
- Catchment area Management Plan 2015
- Ministry of Environment and Water Management: about protection of surface-, and groundwaters: forbidden, allowed, must (*http://www.kvvm.hu/szakmai/karmentes/kiadvanyok/tilos_szabad/tilos_szabad.pdf*)
- Government decree on agriculture use and management of waste waters and sewage sludge (50/2001. (IV. 3.)
- EU 2000/60/EK Water Framework Directive (Vízgyűjtő gazdálkodás http://www.vizugy.hu/index.php?module=content&programelemid=17&id=58&page=1; Vízgyűjtő gazdálkodási tervezés

http://www.vizugy.hu/index.php?module=content&programelemid=57; Vízgyűjtő-gazdálkodási Terv felülvizsgálata tájékoztatás és társadalmi konzultáció http://www.vizugy.hu/index.php?module=vizstrat&programelemid=144)

Suggestions:

- Giving priority to water retention measures in water management.
- Protection of groundwaters, as their renewal gets slower due to climate change. Strong banning of their use for irrigation, if possible.
- Disseminating tips and patterns to decrease houshold water demand (mitigating meat consuming, exchange of products that have bigger water need).
- Lowering water need of agriculture by preferring species that are drought resistant.
- Developing industrial technologies for decreasing water need.
- Expert group emphasized that anabranches of rivers are not used properly, they often get dry already by midsummer, rehabilitation projects are missing, no measures taken against eutrofization. Besides the utilization of artificial water reserviors, retention capacity of anabranches should also be exploited.
- Income from water base use should directly go for the costs of water management.

Positive examples

Farming at the floodplain at Nagykörű

Recently forests embracing Tisza river conserve one of the last and biggest natural floodplains. Unique wetland can be discovered not only on foot but also by boat tours. Locals are to recognize all its values, and now find modes to use it – for example for grazing (Ártéri gazdálkodás Nagykörűn. Kovács Zsolt Csaba - Balogh Péter http://www.ktk-ces.hu/kovacs.pdf; A Nagykörűi Tájgazdálkodási Program és tanulságai. Balogh Péter geográfus, kutatásvezető. http://www.nimfea.hu/tiszaturizmus/25.htm; Ártéri gazdálkodás http://nagykoru.hu/arteri-gazdalkodas/; Gazdálkodás az ártéren http://nol.hu/archivum/archiv-412570-223607).

Farming at foodlain (http://nol.hu/archivum/archiv-412570-223607)

Project has been finished with the title „**Diagnostical investigation of the karstic, vulnerable, karstic waterbase of Miskolc city**". Protecion area has been settled for the 8 karstic wells. Proper monitoring system has been deployed (including temperature, percipitation at catchment area), that eases the quick decision making. Project has been supported by EU and Cohesion Found (Vízbázis védelem: a garantáltan tiszta vízért! http://www.miskolc.hu/vizbazis-vedelem-garantaltan-tiszta-vizert).

3.6. Adverse effects of free trade agreements to Hungary

While negotiations on free trade agreement began in 2013 with USA, concerns arose mostly on agriculture and especially on pesticides. Some 90% of genetically manipulated agricultural products come from USA, where 70% of food products contain GMOs. Near to industrialized agriculture bio farming becomes impossible due to the pollution of genetically manipulated pollens. Genetic manipulation and intensive use of chemicals go together with the centralization of agriculture as well: while USA has 2 million farms (for 373 million hectares cultivated area), EU lists some 13 million farms (for 185 million hectares cultivated area.)
In principle the aim of the free trade agreement is the elimination of the so called non tariff barriers. Presently the customs duties are around 3%, which is so low that has no notable effect on the volume of trade.

Thus it seems that by the elimination of "non tariff barriers" the real aim is to create a regulation coherence, a kind of no regulation if you like, or at least as little regulation as possible. And this is why the three agreements (TTIP - Transatlantic Trade and Investment Partnership; CETA - Comprehensive Economic and Trade Agreement; TISA - Trade in Services Agreement) are referred as "secret takeover of the multinational corporations" or as the "last nail on the coffin of countryside".
The mechanisms of Investor to State Dispute Settlement and Investment Court System cause notable concerns. Many think that precautionary principle would be seriously endangered by the free trade agreements. Some uses the example of the Canadian investor, which, after the CETA would come into effect, could force the Romanian Government to issue permission for the cyanide-technology gold mine at Verespatak. The fact that the relevant negotiations have been encrypted looks to prove the concerns.
Among others, the free trade agreement may threaten the generically not manipulated agriculture of Hungary, which is protected by its Constitution.

The state of art

Some worded that the CETA is nothing but the new face of TTIP, as presently 47 thousand USA firms has have subsidiary companies in Canada, and thus can enjoy all the privileges brought by CETA. Independent experts say that 640 thousand jobs would cease in Europe because of the effects of TTIP (or CETA). More than 3.5 million European citizens gave signature for the protest against TTIP. The *Századvég* study (A Transzatlanti Kereskedelmi és Befektetési Partnerség (TTIP) társadalmi és gazdasági hatásairól - Vitaanyag. Századvég Gazdaságkutató Zrt. 2014 december 16. https://www.scribd.com/doc/285870019/Szazadveg-vitaanyag-I-resz) found that TTIP or CETA would not be advantageous for Hungarian agriculture; may result loss of agribusiness markets. In the same time the report mentions some examples: it states that Hungary might gain some competitive advantage at wheat selling. Experts thought the one of the winners would be automotive industry, and that could offer benefit for Hungarian vehicle industry as well.
The **European Environmental Bureau (EEB)** in December 2016 expressed its concerns (http://www.eeb.org/EEB/assets/File/Memo_MT_Presidency_EEB_final_v2.pdf) about TTIP and CETA that can have serious negative effects on the environmental policy of EU. It asked the European Committee to assure that no free trade agreement could harm environmental interests; including the areas of energy, climate, chemicals, agriculture or food chain. **Hungarian Chamber of Agriculture** issued a statement about their opposition of CETA (Az agrárkamara szerint aggályos a CETA. http://www.hirstart.hu/hk/20161004_az_agrarkamara_szerint_aggalyos_a_ceta). **Sustainable Development Committee of the Hungarian Parliament** also suggested that Hungary should not vote for CETA.
Finally the **European Parliament** on 17th of February 2017 voted for the ratification of CETA (Megszavazta az Európai Parlament a CETA-t. Facsinay Kinga, 2017. február 15. http://mno.hu/gazdasag/megszavazta-az-europai-parlament-a-ceta-t-1386074) with some minor, but notable modifications:

- If any of the Belgian provinces would not sign the agreement, the Belgian national government will not be entitled to do so.
- Standpoint of the European Court will be requested on the Investment Court System: How could it fit into the European law system and what kind of effects could it bring. It is supposed that officially that will be requested by the Belgian Government, but that had not happened by the time this chapter has been finished.

About 90% of the agreement came into force, but the parts on Investment Court System did not; that needs the ratification of CETA in member states. Until the time of the finalization of this chapter none of the member states ratified the agreement. In the same time "TTIP-free zones (https://www.ttip-free-zones.eu/node/99) are established around Europe: more than 2300 local governments stated that they will not permit TTIP to entry into force TTIP, e.g. Vienna, Barcelona, and some Hungarian ones too.

Prime Minister of Canada, Mr Justin Trudeau and President of the European Parliament, Mr Antonio Tajani at the approval of CETA

Suggestions:

- The assessment of possible effects of free trade agreements should be refreshed. Umbrella organizations of local governments, economic interest groups and representatives of society should be involved.
- ~~For~~ forming national position negotiations with the V4 states and also with the member states of Danube Region Strategy (EUSDR) could be helpful.

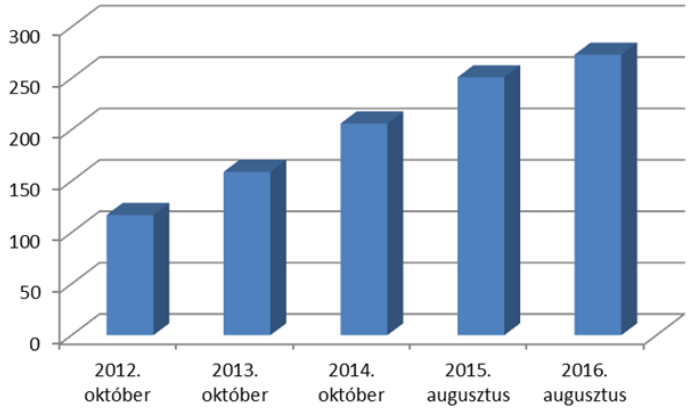
Good examples:

Community Farming

Community farming has different versions. In some cases the consumer makes an agreement with the producer: when, what and on what price will be delivered. Due to other version the farm delivers a big basket of seasonal vegetables and fruits every week. The organizations not only meet traditional expectations, but usually the economic organization also follows new directions. (Examples: Közösségi mezőgazdálkodás http://tudatosvasarlo.hu/csa; Eco-Motive http://eco-motive.gak.hu/; Szatyorbolt bevásárló közösség http://szatyorbolt.hu/bevasarlo-kozosseg; YouTyúk http://youtyuk.hu/)

Product of a bio farm: YOUTYÚK (following the well known film sharing page, tyúk = hen)

The Committee on Environmental Policy (UN ECE) aims to enhance various directions of green economy (especially the BIG-E commitments at Batumi Conference https://www.unece.org/fileadmin/DAM/env/efe/Batumi/Hungary.BIG-E.e.pdf). In January 2017 a special session has been made for short introduction of initiatives, including Hungary's **Farmers' Market** project. The successful show case has been welcomed, as it widened the scope of green economy that usually focuses on industry, energy, efficiency.



Number of Farmers' Market in Hungary

Short supply chain and farmers' market not only creates jobs and thus tax income, but also anchors the traditional expertise. Furthermore, as the sector is competitive by its fresh and healthy products, it directly enhances sustainable agriculture techniques, and helps biodiversity too. While in 2012 only 117 farmers' market worked in Hungary, in 2016 one could buy fresh and nearby produced vegetables and fruits at 273 markets. (Hungarian success at the session of UN ECE Committee on Environmental Policy. http://eionet.kormany.hu/magyar-siker-az-ensz-kornyezetpolitikai-bizottsaga-ulesen)

Farmers' Market. Photo: Gergely Botár

3.7. Environmental aspects of migration

Recent migration is not a typical environmental trend, but its causes and impacts overlap environmental issues.

The World Economic Forum (which also organizes the meetings in Davos) found that in 2016 the most serious global threat is climate change, while the most likely is big scale migration. Climate change makes living in vulnerable areas even more rough, where locals, as consequence, are likely to start their migration.
Due to a report of the U.S. Department of Defense (Releases Report on Security Implications of Climate Change http://www.defense.gov/News-Article-View/Article/612710) more and more extreme weather worsens the conditions of life and security, and also weakens the ability of governments to guarante a certain minimal living standard. Climate change thus may intensify such tension making elements as poverty and political instability. It also makes ideal conditions for terrorism. As Mr Barack Obama worded: "climate change means serious threat to global security and a direct risk to our national security". He also named Boko Haram in Nigeria and ISIS as examples when environmental trends also had role in the rising of terrorist organizations.
But we had much more such conflicts: due to the database of Pacific Institute from 2011 until the summer of 2015 some 59 military conflicts exploded for water resources. For example in 2012 there were border conflicts between Mali and Burkina Faso, there were demonstrations of Chinese workers against a polluter Japanese firm, and there were clashes between shepherds and farmers in Kenya – all for water (http://index.hu/gazdasag/2015/08/31/viz/).

In Syria and Iraq, having an area that has been referred to as Fertile Crescent, people have been facing droughts for centuries, but in 2007 a new one begun that was much stronger than the average. Now we know that the dry period offered fertile environment for the civil war. Due to the research of the American *Center for Climate and Security* in Daraa, 60% of the arable lands of Syria ~~have~~ been affected by one of the cruelest droughts of modern history. That forced about 1,5 million Syrian to leave their homeland. 75% of the farmers had a land that was not arable anymore, so migrated to cities. There it was already hard to get job due to Iraqi and Palestinian refugees. That led on the spring of 2011 to the Daraa revolt, where just those who lost their lands started demonstrations. That demonstration has been overcast, but it only resulted further demonstrations in other towns. These demonstrators were later radicalized by Islamists, utilizing money and guns sent from countries at Persian Gulf.
It is not ISIS the only organization that owes a lot to the chaotic weather: due to a research published in Africa review (Climate change fuels Nigeria terrorism http://www.africareview.com/News/Climate-change-fuels-Nigeria-terrorism/-/979180/1334472/-/vq4tja/-/index.html) Boko Haram in Nigeria also could gain strength because of the drought.
The 33 countries that are mostly endangered by water scarcity, 14 ones are in Near East and North Africa. Furthermore, in many countries the water consumption demand will rise – not only at the level of households, but also at the level of industry. It is not clear now how this demand will be met, as rivers of the area are spectacularly lessening, or heavily polluted.
The Max Planck Institute and the Cyprus Institute foretell that in Near East and North Africa heat soon will become unbearable, which together with stronger sand-storms and worsening air pollution may cause very serious challenge for the 500 millions who live there.
The area already suffers from the effects of climate change. The number of extreme hot days in a year doubled since the seventies. While between 1986 and 2005 we had 16 extreme hot days in average, by the mid-century we will have 80 ones-, and by the end of the century we will have 118 extreme hot days – even in the case if we decrease the emission of greenhouse gases after 2040. Results of researches depict that even if we do our best to mitigate climate change, the hottest areas will have to be escaped.
It is useless to find out if terrorism or climate change represents bigger risk, as the two trends goes together.

Suggestion:

Due to the opinion of the expert group the issue is not-, or not only political. Thus the relation to climate-refugees has to be reconsidered following the emerging questions: Will they live in colonies or will they integrate? What will they do? Will they do farming? What economical effects will they have? What hygienic circumstances will they have? Will they want, and will they be able to adapt to the culture of the majority? How will the majority relate to them? What social conflicts can be foreseen? Where will they move, where will they be located? What effects will they have on social system, on health care and on other distribution systems? All these answers should be prepared in a proactive and strategic manner.
The health care issues have special importance. Possible infections and epidemics must be prepared for. It can be needed to offer a health training for the immigrants as they socialization is different.
For converging linguistic and socio-cultural differences certain strategies and action plans are needed.

Positive examples

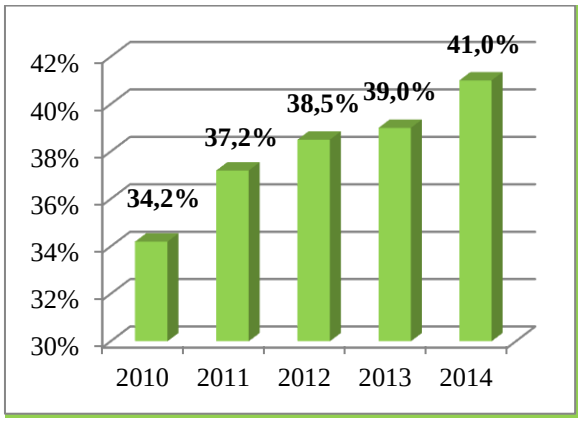
Beloiannisz

The Greek village named Beloiannisz, situated abut in the middle of Hungary, has been built for the refugees of the Greek Civil War in 1950. The society today is mixed, but generations protect and teach their cultural values, typical traditions, mentality – through the education of Greek language.

3.8.Waste management

Waste management in Hungary has been transformed in the last years. Our country is open, is not rich in row materials, and in certain aspects is in growing dependency, thus resource efficiency, conscious, smart and effective management has key importance. It is of basic importance to avoid overuse and to minimize environmental loads – for social-, environmental-, supply-security-, and for competitiveness aspect. Still, in the recent economyc system the careful and effective use of resources is far from general. Material use is about steady, and waste generation is decreasing. Stronger resourc-efficiency could help competitiveness of the country.
Considering the problem of waste, transported from abroad into Hungary, is unsure. Some reports state that at the western boarders waste piles appear – directly at the edges of forests in Western Danubia, with the logos of restaurants of neighbouring countries. Gossip says that certain jobs at neighbouring countries are accessible only if employer is ready to bring some waste to Hungary on weekends.

In 2013 waste came from industry (32.9%), building and demolition (21.6%), housholds (21.4%), houshold waste water (15.5%), hazardous waste (3.2%), agriculture and food industry (5.3%).
The rate of deposition is still relatively high in Hungary, while the total amount of waste to be deposited shows a decreasing trend.
Deploying the selective waste collection reaching each household brought notable results for paper-, metal-, and plastic waste streams. The amount of secondary row materials has doubled; their reuse must be enhanced.



Paper, metal, plascic and glass waste reuse in Hungary

The so called environmental product fee has positive effect on the environmental loads. For example before 2012 some 3,300 tons of plastic bag was produced, as they were free. Now that they have price just like all other products, it is less than 1,700 tons. Using plastic bag is not „trendy" and more.

Separate collection of biologically degradable waste aims to bring down the amount of waste to be deposited. Household level-, and community level composting of „green" waste has not only strong effect on environmental awareness, but has also great economic benefit while riching the soil.

Aims and measures

- Preventing waste generation and enhance reuse;
- Responsibility of the producer must be strengthened, especially while planning lifetime and reuse of products, limiting pollution content, and enhancing material reuse;
- Offering better legal and economic environment for reuse;
- Developing relevant monitoring system;
- Research on economic possibilities of reuse for minced tyre;
- Creation systems for selective collection and selection;
- Establishment and support of reuse centers and systems for reuse;
- Increasing the target on household waste preparation for reuse up to 65 % by 2030;
- Increasing the target on package waste preparation for reuse up to 75 % by 2030;
- Decreasing the rate of household waste depostion down to 10 % by 2030.

Suggestions:

- Consuming – in spite all relevant campaigns – is growing. It is suggetsted to close consume – collect – reuse loops. Materials that are considered as waste are already reused for example in The Netherlands. (Others think that not the collection – reuse side should be enhanced but the prevention. In the same time prevention of generation of waste is something hardly measurable and indicated with simple numbers.
- Since waste deposition has cost, we now have less waste to be deposited. Pricing seems to be a great motivation. On the other hand higher deposition costs may generate shift towards illegal dumping. If this is the case, price system must be modified.
  It is also suggested that incomes from deposition should not go into national budget but directly to waste management goals and reuse. It has special importance in Hungary where reusing of waste does not cover the costs of this industry.
- Selective waste collection has different rules in the different settlements. This may pose disadvantages and advantages too, as local conditions can be smartly utilized.
- Campaign is needed about the nearest car tyre receiving location, and about its free services.
- Incentives where enterprises aim to utilize each others waste is to be enhanced. Economic motivation has important role, e.g. tax benefits.
- Purposeful and planned run-down of products should be sanctioned towards the producers. Warrant for refigerator, washing machine should be longer than one year.
- Technology changes in industry for best practices should be enhanced.

- Reusing simple things should be disseminated. E.g. glass jar of jam can be used in households, paper and plastic boxes can be used as children toys, used paper sheets that have one emplty side are great for making notes.
- Reuse centers could collect all products that are not needed anymore but are in good state; others could take them – after paying for their storage. These can work in the frame of „shelf-shops", or can cooperate with social organizations.
- Propagating compostation has great possibilities – mostly at gardenhouse areas. Composting at housing estates needs longer organization, but there are benefits in the longer term.
- Expert group states that the number of wreck cars apearing around the country is growing, as at least two legal doors are left open. Their „closure" needs legal modifications.
- Experst suggest researching the possible contaminations in dustbins. It is likely that they may propagate salmonella, dysentery and other bacteria. Rodents and insects may also shelter in them.
- Notable part of society does not use selective bins even if they are deployed. Acceptance of selective collection is still not general, and it has nothing to do with age or income level. Education and disseminating campaigns have important role. Extension of selective collections to public institutes and companies could also help.

- When planning waste management, it is not only economic considerations that must be taken into consideration.

Great examples to follow

You Pick (Teszedd!)
This initiative is now the greatest volunteer movement of the country. In 2016 it has its third year, and was also part of the *Let's Clean Up Europe!* international waste collecting action (where Hungarians have been the most active for years).

Poster of a local action in 2016 (*http://csanadapaca.hu/sites/default/files/teszedd16.jpg*)

The **PET Cup** (PET Kupa) is non-profit NGO against waste pollution at Tisza River. Events, waste collections, team building trainings, exhibitions and professional debates are organized all year around. Main goals: protection of natural waters, dissemination of water sports (kaiak, kenu), and community building. They also organize research flood-plain waste monitoring, nature conservation and environmental awarenes raising (http://petkupa.hu/hu_HU/; http://www.kormany.hu/hu/foldmuvelesugyi-miniszterium/kornyezetugyert-agrarfejlesztesert-es-hungarikumokert-felelos-allamtitkarsag/hirek/mar-lehet-jelentkezni-a-teszedd-akciora; http://szelektalok.hu/teszedd/; https://www.facebook.com/teszedd/).

The first „Waste eating Waste ship" (Resource: *http://petkupa.hu/hu_HU/*)

The **Ladybird Farm** (Katica Tanya) is a well-known leasure-time center, and is engaged for sustainable future. Attractions do not need energy, or are run by locally generated renewalbel energy. 80% of

electricity need is covered by its solar panels, and has its own ecologic wastewater treatment plant. A special institution is the so called *waste exchange*, what means that part of the entrance ticket cost can be redeemed by waste. Children and adults are eager to collect waste now (http://katicatanya.hu/).

Animals at Ladibird Farm

Cellux Group where artists and children work together – leaving behind the A/4 world's dimesion. Row materials come from household waste, as environmental awareness is a basic priority. Group encompass designer, psichologist, teacher and sociologist, thus they utilize all these aspects. The baisc of their work is an idea, a conversation, a tale, a fantasy, but also can be global social or environmental issue (http://www.celluxcsoport.hu/#/index).

Some products of the *Cellux Group*

The **Pool Group** (Medence Csoport) saves textile-PVC based posters from waste dump and gives them one more chance as bag, purse or tant. Bags are especcially popular as mostly ladies appreciate the unique bags tailored by temselves, and thus are unique on Earth (http://medencedesign.com/).

Resource of picture: Foundation for Circular Economy (*http://circularfoundation.org/*)

Retextile Foundation (retextil Alapítvány) has been established in 2004 in Pécs city for conserve and dissaminate a method for reusing all textile wastes. They do not use other energy than human labour, but need common creativity as well. „The retextile is a language that helps discovering the organic basic of our created world" (http://retextil.hu/).

Retextile Foundation

Composting Program is organized since 2011 in Újpest on every autumn. Besides technical infrastructure information and dissemination campaign is also organized (http://www.ujpest.hu/hir/10078/keres).

(Resource: http://www.ujpest.hu/hir/10078/keres)

Awareness Raising and Reuse Center has been opened to host waste court (for selective collection). It also has department for leaving anything that is not needed by the owner any more, but still can be used by others. Conferences, exhibitions, workshops are also welcomed (https://www.zoldbolt.hu/hirek/kezdemenyezesek/ujrahasznalati-kozpontok-nyiltak-budapesten).

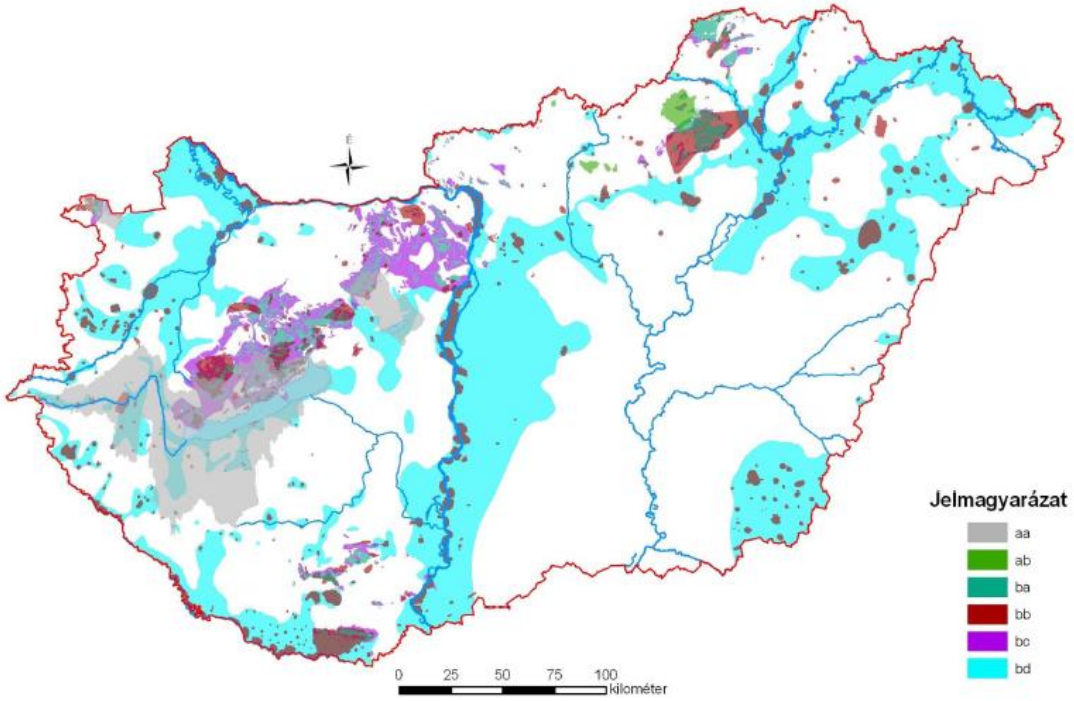
New Reuse Center at Újpest (Resource: fkf.hu, by László Horváthm FKF Zrt)

3.9. Soil in quantitative and qualitative danger

The soil: optionally renewable resource (EIONET Hungarian network workshop 06.03.2017.). It is not replaceable and is immovable – during its transfer it loses functions. Hungarian Constitution names soil as one of the values to be trasmited to future generations. Even so the state of soils in Hungary is worsening which has many reasons.

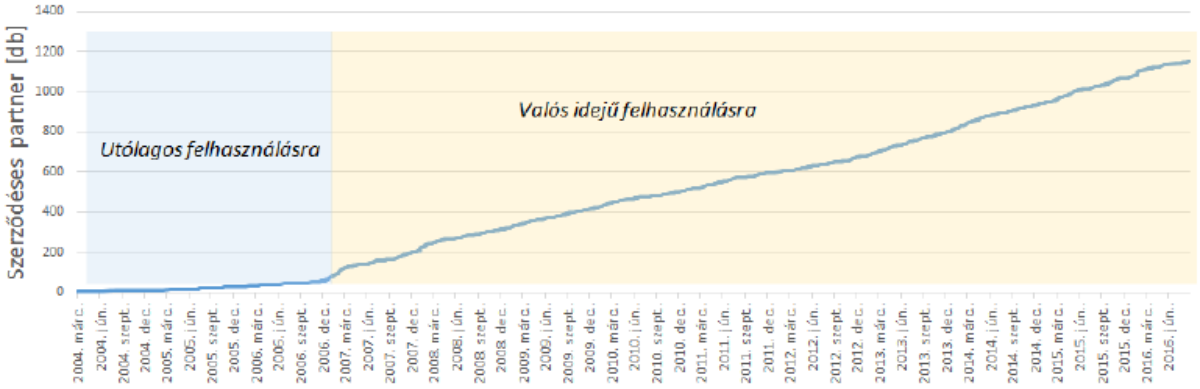
When climate changes and temperature rises, decomposing processses in soil speed up. But are the nutirent content compensated?

Present system for assessment of the value of soil does not express real value of it, stated Mr Marcel Szabó, Representative of Future Generations in November of 2016, referring to its ability to sequester carbon, retain water, ability to renewal and other abilities. The science for ages focused on the fertility, which is rather disputable. Use of artificial fertilizers peaked in the end of the 1980s (with 230kg/ha in average), recently it is around 50kg/ha. Due to a research in 2016 half of the Hungarian farmers never disperse phosphor or potassium on their land, and their notable part does not know the type of their land



Nitrate-sensitive areas in Hungary in 2006. Resource: NTKSZ Térinformatika

Soil protection cannot be fully automated. In the same time precision agriculture over certain size of land may offer notable help for the protection of soil. Precision agriculture can help avoiding nitrification.



Number of farmers requesting data for precision agriculture in Hungary

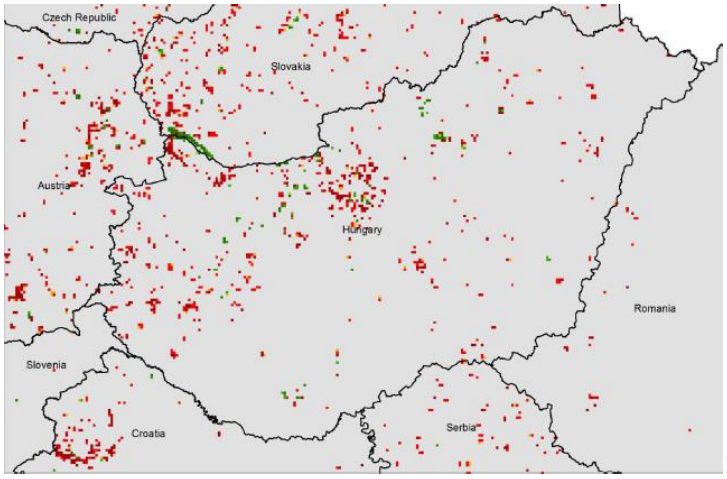
(Resource: : A GNSSnet.hu arcai http://www.sgo.fomi.hu/kgo40/6_Galambos-GNSSnet.hu%20arcai.pdf)

Experts agree that bio farming enhances the protection of soil. In the same time diffusion of organic agriculture is slower than has been expected. Many things that the relevant data may be misleading: great amount of farmers follow organic methods but are not registered as bio farm as the administrative procedure is too costly for them.

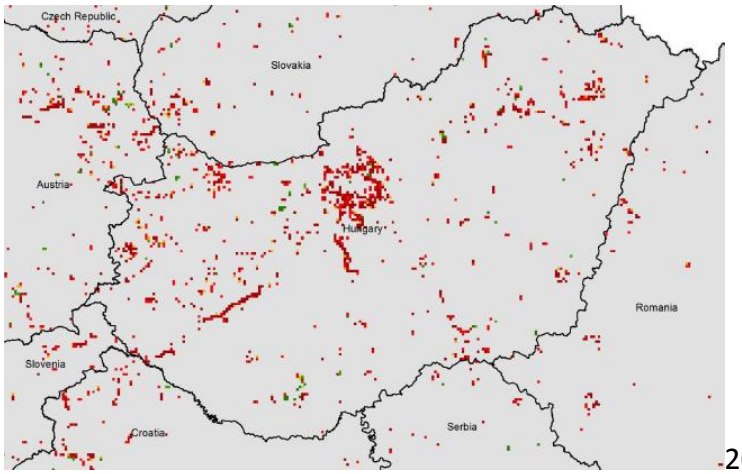
Green waste and agricultural by-product goes to power stations as renewable energy. Loosing soil cover may threaten natural organisms and thus organic content, and so the fertility is in danger.

Due to the data of the National Countryside Strategy

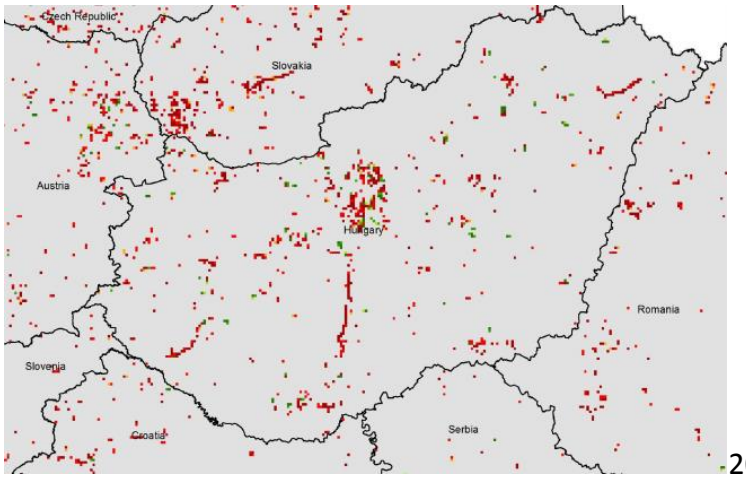
Yearly landtake is some 5000-7000 hectares (data of National Countryside Strategy), while land cover is around 3000 hectares per year – mostly to the counts of arable lands. Most of the areas are to be built in as results of many local decisions.



1990-2000



2000-2006



2006-2012

Landtake in Hungary. *(Resource: FÖMI, CORINE)*

Erosion is something to consider, especially at the hills. Problems involve agriculture, forestry and nature conservation. We have weak database on effects of illegal waste deposition on soil.

Policies

Relevant regulations are sometimes inconsistent. In general relevant policies (National Environmental Program (NKP), National Sustainable Development Strategy (NFFS), National Environmental Remediation Program (OKKP), National Countryside Strategy) and laws are adequate, but implementation looks to be weak.

We do not have data on the brown field areas, on their situation. Within the borders of the capital, 13% of Budapest can be considered as brown field (Győri 2006).

It is definitely great that in Hungary the rate of afforested area is growing. The settled aim is 27%, presently we are around 20-21%.

Suggestions:

- Implementation of existing policies should be enforced.
- Precipitation retention has special importance.
- Information for farmers on soil types, area sensibility, necessary fertility measures. Special attention should be paid to good practices for better soil quality
- Agricultural support system should take into consideration the changes of the soil quality.
- Lows on biomass providers and users should be strengthened and implemented carefully.
- The effects of deforestation and demolition of surface flora on soil should be revealed.
- Connection between flash-rains and soil erosion should be revealed. Support should be offered ~~for~~ to measures against erosion even if without agricultural land cultivation.
- State should support the costs of the procedure of official bio farming recognition.
- Proper education of ecological farming has basic importance. Interdisciplinary approach and integrated pest control should be emphasized, which can react to changing climatic-, market-, or societal events.
- Spokesman of Future Generation, Mr Marcel Szabó advised to ban all green field investments until the reuse of brown fields. Some experts think that is not a feasible aim, only a dream, but it is agreed that a strict limitation could slow down the shrinkage of arable lands. It is advisable anyhow to assess and map all brown fields, including info basis with their ownership.

Positive examples:

Urban gardens

Urban gardens offer great opportunity for studying gardening, compensating nutrients, and composting. Furthermore, community gardens are to create and revive communities; actually in many cities this is the main goal of establishing gardens – even at housing estates(www.varosikertek.hu/; kozossegikertek.hu/).

Community gardens all year round. *(Resource: Városi Kertek Egyesület – Urban gardening Associety)*

Urban gardens may offer functions for areas that are temporarily abandoned. Brown fields may gain daily changing landscape that is favourable for the assessment of the quarter, and thus is beneficial for the value of properties.

Ecological farming: Hernádszentandrás

The settlement with 435 inhabitants developed its agricultural production that does not use chemicals. The work is cooperation with churches and NGOs. Locals state that the demand would purchase much more products as well(https://mno.hu/belfold/teglarol-teglara-tudatosan-2394656; http://vegallomasetterem.hu/bioszentandras-zoldsegek-a-konyhankban-es-a-tanyeron/; http://www.boon.hu/miskolc/duplajara-no-az-iden-bioszentandras/1939393; www.bioszentandras.hu).

Schoolgardens

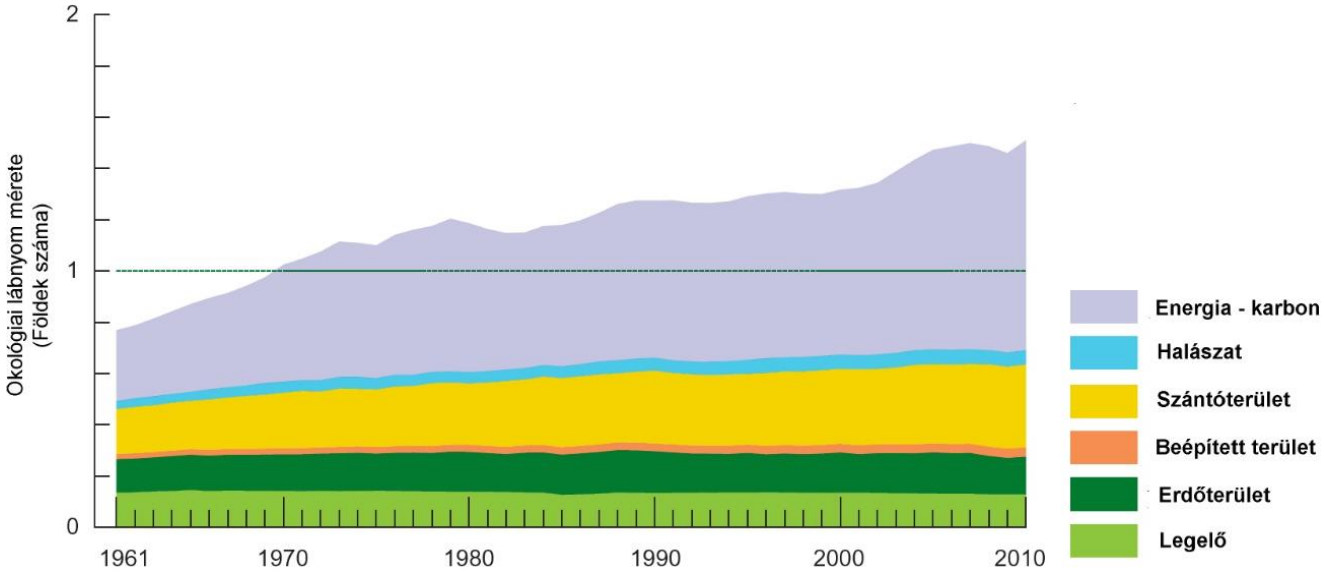
Schoolgardnes have their renaissance also in countries where only few percent of society works in agriculture. In welfare societies they stay for generating demand for healthy food. The education focuses on sustainability: The gardens not only help understanding nature, it helps responsible care taking.


Schoolgardens (Resource: www.iskolakertekert.hu)

3.10 +Alternative energy use gains attention

Alternative energy use gains attention

Viewpoint of natural sciences is that the way we are using our resources cannot be continued. It is the ecological footprint that reveals it clearly: we traspassed the limits of sustainability, and recently we are witnessing a collapse. If we do not reform our systems, the whole humankind may fall.



Ecological footprint (Resource:https://www.sitra.fi/en/articles/sitra-trends-our-ecological-footprints-are-outgrowing-our-shoes/)

In Hungary building **water power plants** is not beneficial over a certain size, or is not supported due to water management reasons. The so called “dwarf” water power plants are heavily debated. It is to consider in every certain case if investment, maintenance costs and environmental loads are surpassed by the value of the energy produced?

Hungary has great possibilities in renewal energy, especially in geothermic energy, solar energy and using biomass. When using biomass for energetic purposes; ecological-, environmental-, water management aspects and effects must be taken into consideration as well as maintaining safe food support, soil recovery and fodder production.

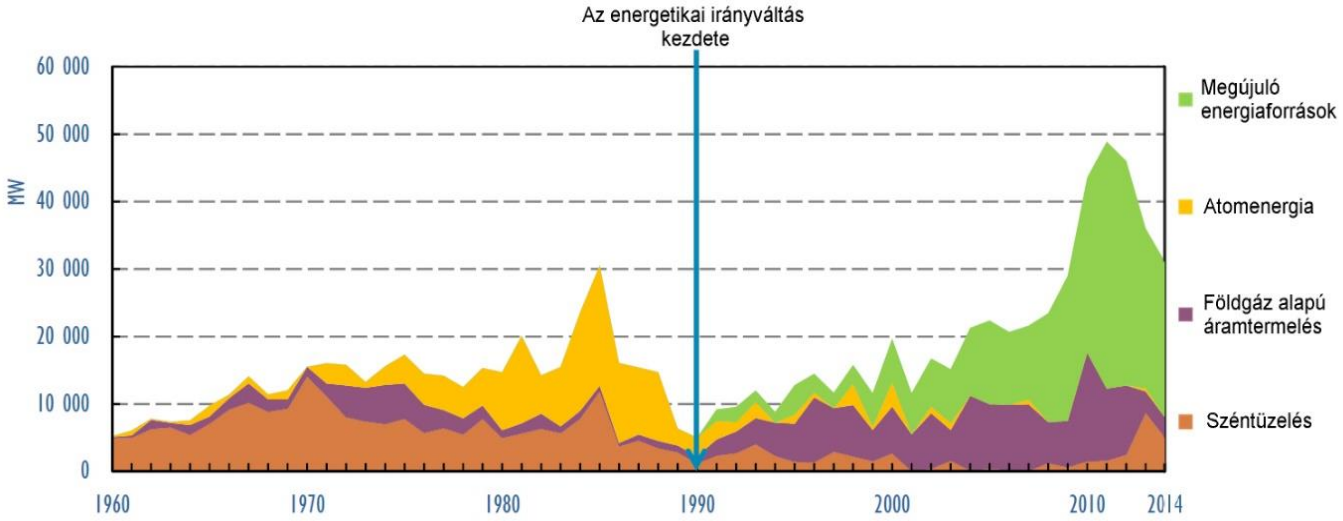
Sustainable use of **geothermic energy** requires not exploiting more renewable energy than would be able to be reproduced.
During aligning and operating **wind farms** negative effects on natural and landscape values must be avoided or minimized.
In Hungary it is the solar energy that has special role.

Renewable energies in Hungary (resource: Eurostat http://ec.europa.eu/eurostat/web/energy/data/shares)

2004	2009	2010	2011	2012	2013	2014	2015	2020 aim
4,4%	8,0%	12,8%	14,0%	15,5%	16,2%	14,6%	14,5%	13%

Expert group calls attention to the importance of distinguishes between renewing energy (solar) and conditionally renewal energy (forest, biomass).

On global scale within five years renewable energies will take the leading role from carbon energies (https://www.ft.com/content/09a1f984-9a1d-11e6-8f9b-70e3cabccfae ; http://www.bbc.com/news/business-37767250). While carbon energy presently gives bigger rate of the total, wind and solar power plant investments hit bigger and bigger peaks.



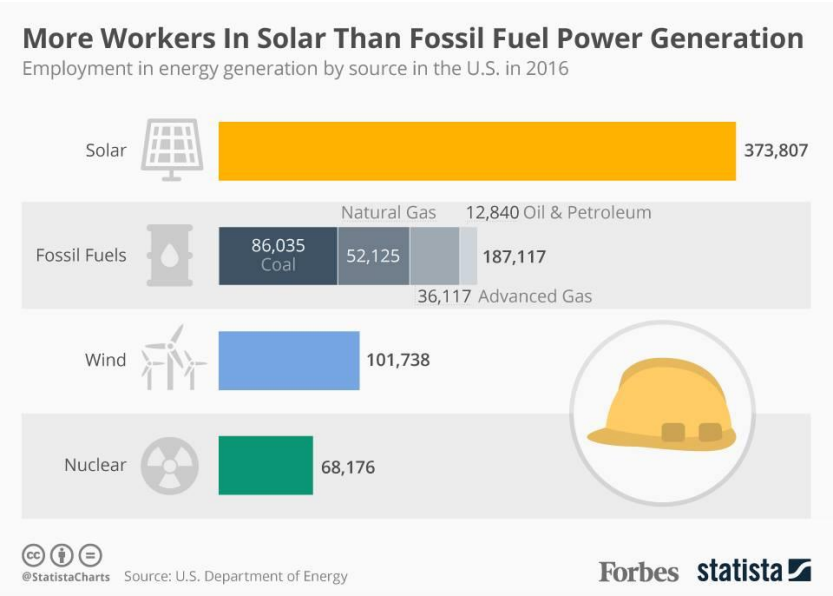
New electricity producing capacities in OECD countries
*(**Renewable energy, Nuclear energy, Natural gas, Coal**)*
(Resource: International Energy Agency: Re-Powering Markets https://www.iea.org/media/presentations/160218_RepoweringMarkets_slides.pdf)

Due to the International Energy Agency in 2016 only in China two new wind turbines have been aligned in every hour, and globally every day 500 000 solar panels were installed in average.
In December of 2015 the first energy supplying bicycle road has been inaugurated at Tourouvre-au-Perche, Normandy.
Since the first days of 2017 Dutch trains work without CO_2 emission, as it goes with electricity made only by wind (http://brightvibes.com/443/en/today-all-dutch-trains-are-powered-100-by-wind-energy).

Bloomberg published its report in December 2016 saying that solar energy is cheaper and cheaper, and it is already cheaper than wind energy (https://www.bloomberg.com/news/articles/2016-12-15/world-energy-hits-a-turning-point-solar-that-s-cheaper-than-wind). TESLA solar sytem is estimated to be ~~soon~~ installed soon for some 4-5

million new homes in USA. To show the technical progress: solar panels on the backpacks of explorers are able to charge telephone, camera, computer or even drone (http://inhabitat.com/next-generation-of-voltaic-solar-backpacks-can-charge-laptops-cameras-and-even-drones/).

It was also Bloomberg that stated that in 2016 in the USA 14,6 gigawatt solar energy producing capacity has been aligned, that double the total solar capacity, and first time in history became the main electricity producing mode (https://www.bloomberg.com/news/articles/2017-02-15/u-s-solar-surged-95-to-become-largest-source-of-new-energy).

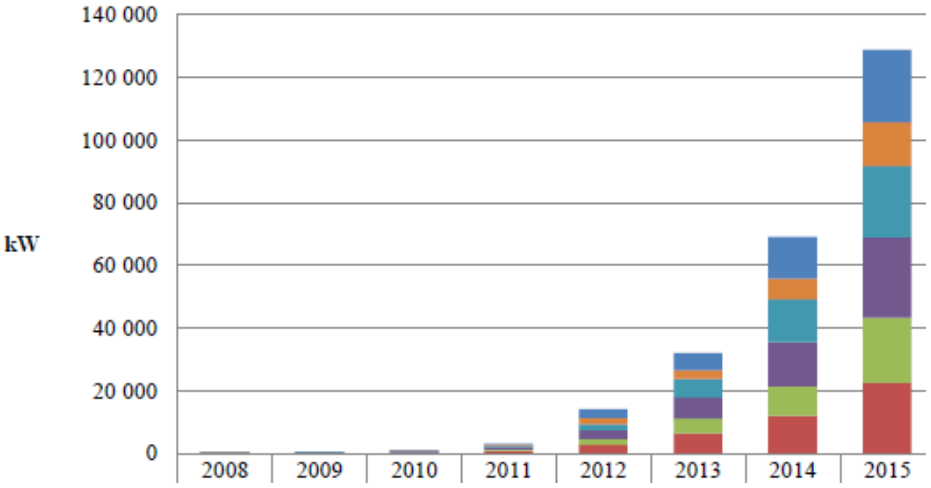


Employees in USA energy sector

(resource: www.facebook.com/350.org/photos/a.136077452707.110998.12185972707/10155011502132708/?type=3&theater)

Some years ago it was obvious that to run houses and other buildings we need notable energy. Recently we know that the so called **"zero houses"** can produce their own energy need, thus their energy balance gives zero. In certain cases we already can have **"positive houses"**: buildings that can produce much more energy than their need, and thus can load that back to the electric grid. So after all, their energy balance is positive.

In Hungary the household-scale power plants show rapid growth: their capacity as 0,51 MW in 2008, and by the end of 2015 it was over 128 MW. Then we had 15226 household-scale power plants, which, considered to the 8903 in previous year, was a 71% increase (http://enhat.mekh.hu/wp-content/uploads/2015/10/osszefoglalo_nem_engedelykoteles_kiseromuvek_adatairol.pdf).



Capacity of household-scale power plants in Hungary *(2008-2015)*

Resource: http://enhat.mekh.hu/wp-content/uploads/2015/10/osszefoglalo_nem_engedelykoteles_kiseromuvek_adatairol.pdf

After all we can state that our energy system is reformed (http://munkacsy.web.elte.hu/ERRE%20VAN%20ELORE%202.1.pdf). Not only that the role of coal will be taken by renewal energies, but also that centralized systems will be more and more be replaced by local energy supplier systems. Experts think that by 2050 45% of EU energy demand will be met by communities and households. Of course these changes need notable investments. For that, countries follow different strategies, e.g. Poland has launched its "green state bond".

Hungary's recent **Energy Strategy** has been approved in 2011. Since that time important changes happened:

- After the Fukushima tragedy security measurements have been introduced, which made nuclear energy much more expensive.
- Cost of solar energy is "plummeting".
- Countries of the Earth have signed the Paris Agreement on climate – with notable engagements.
- As a result of terrorist attacks, energy security gained superior importance.
- The strategy counts with 1 – 1.5% increase in energy demand yearly. Since that interior energy demand has decreased, and experts think that it can be further decreased (e.g. housing techniques).

Considering these trends some experts find it needed to update the Energy Strategy. In the same time it is important to emphasize that during time important policies have been made, for example:

- Law on energy efficiency (based on 2012/27/EU Directive);
- National Energy Efficiency Action Plan;
- National Housing Energy Startegy (NÉeS; 1073/2015. (II. 25.) Korm. hat.)

Suggestions:

- As notable changes have happened since the elaboration of the National Energy Strategy (e.g. price drop of renewable energies, climate change, energy security, decreasing trend in Hungarian energy demands etc.) the updating of the strategy can be needed.
- It is needed to enhance the comprehensive use of innovative solutions for renewable energy. Separate trend could help practical test of inventions, as well as flagship projects for practical use.
- When using biomass energy it is needed to consider renewal ability and to provide all conditions for that.
- When exploiting geothermic energy environmental, water management and renewal ability must be also taken into consideration.
- When planning wind turbines nature and landscape conservation also must be considered.
- Possibilities of more intensive use of solar energy must be examined.
- Regional energy supplier systems as well as alternative energy systems of public institutions must be enhanced and supported.
- Besides the use of renewable energy, it is still of high importance to help and disseminate energy saving and energy efficiency.
- Economic-social solutions should be elaborated that provides the opportunity also for the low income households to live with sustainable solutions, even with zero starting capital, reimbursing costs from the benefits.

Positive examples

The most known example ~~for~~ of combined use of solar energy and energy saving is the so called **"village house"** in the 3rd district of Budapest. The walls have been insulated; some 1800 windows have been

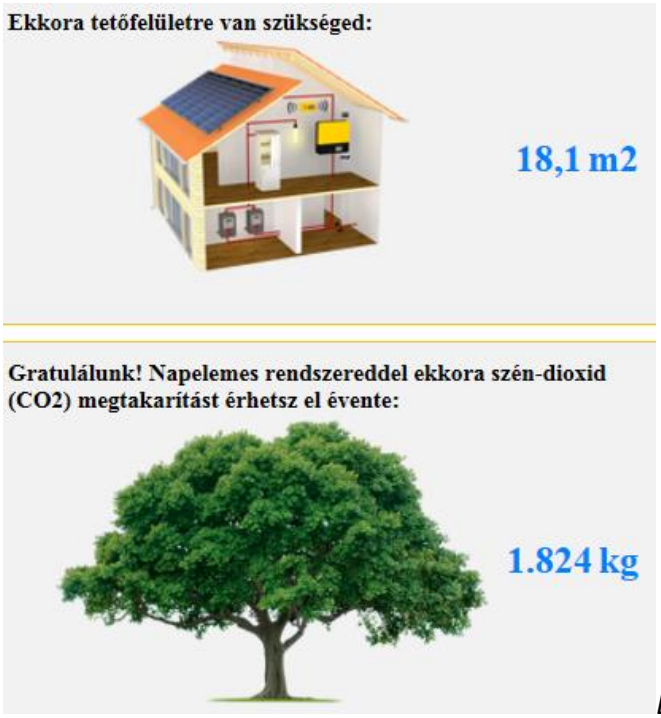
exchanged. District heating system has been modernized, and measurement equipments have been aligned. The roof now has 125 solar collectors, all together having some 1515m^2 surfaces. As a result in 2011 almost 45% less cost were recognized for heating and hot water than in 2004 (http://faluhaz.eu/ ; https://energiaklub.hu/hirek/faluhaz-egy-mintaprojekt-tapasztalatai-3308).

„ECO-housing estate" in Budapest

The **"Warmth of home"** (Otthon Melege) Program encompasses the exchange of obsolete household machines (refrigerator and washing machines, boilers) as well as the exchange of doors and windows or complex energetic renewal of family houses. In 2016 some 50,000 households have progressed in energy efficiency.

Production of **tiles with solar cells** is planned to be started in 2017. It visually looks just as the traditional tile, so can be used even on protected buildings. Installation of the elements will be provided by the producer (http://www.alternativenergia.hu/magyar-napelemes-tetocserep-nyaron-indul-a-gyartas/68048).

Another firm offers online calculator for easily planning the solar energy system for the required energy capacity (http://okosnapelemrendszer.hu/napelemszamitas/).

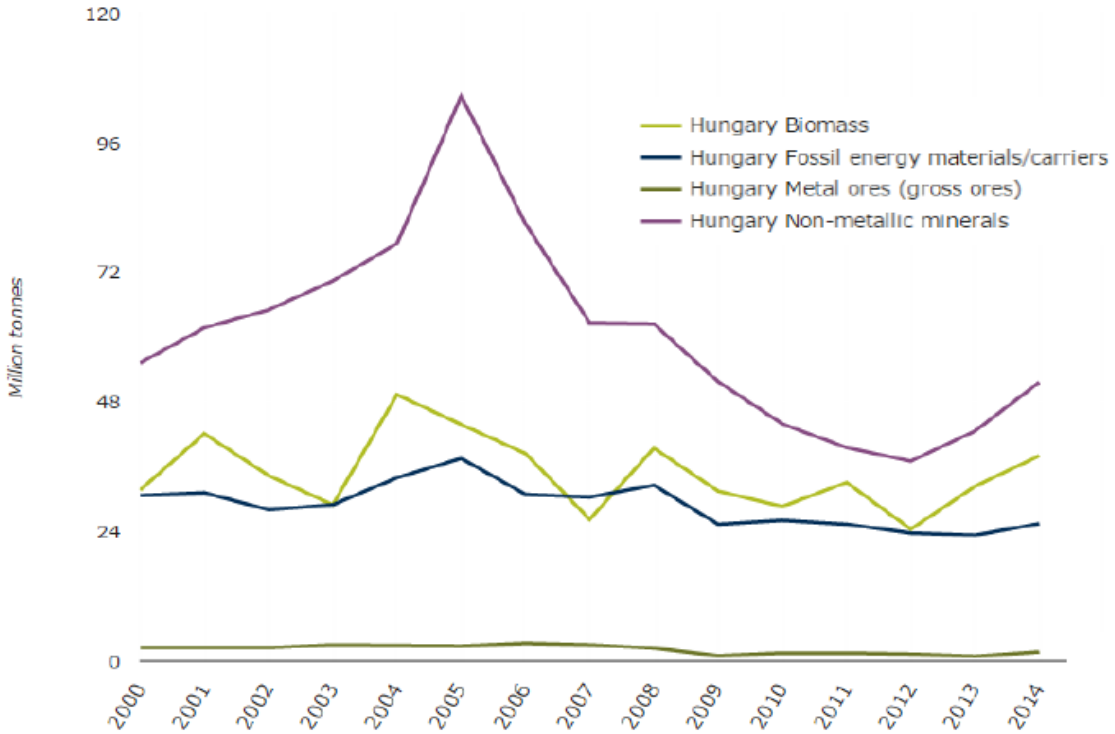


Detail from the online solar system-calculator

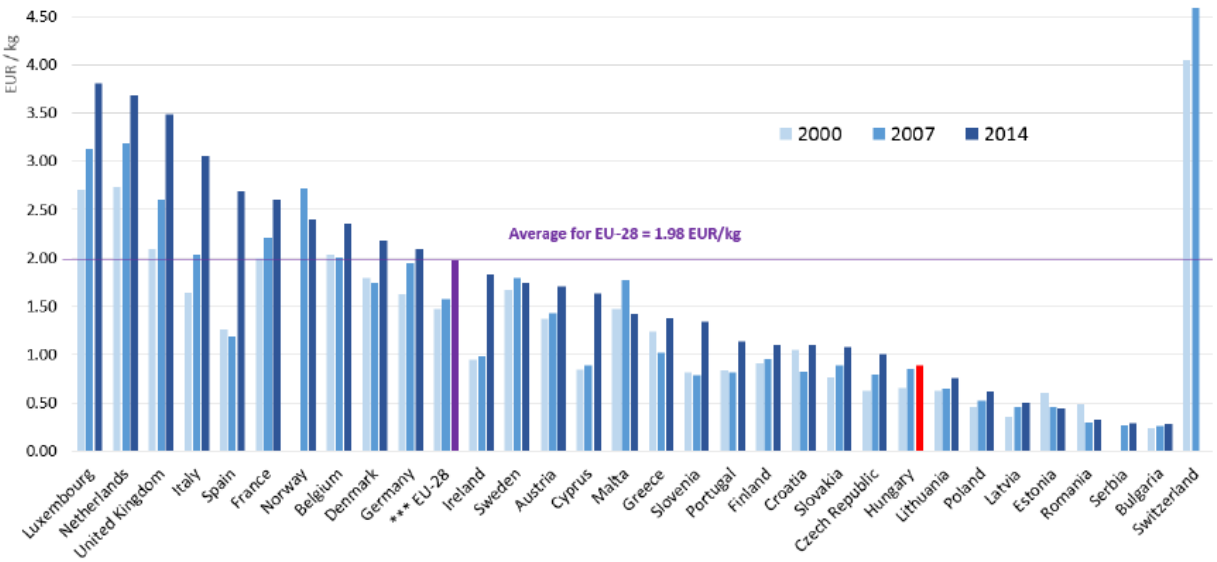
3.11.+Effective material use gains attention

More and more attention is focusing on waste reuse. The method on the one hand is pretty simple: it is cheaper to reuse glass, plastic and metals than producing them again. On the other hand this raises tricky technical questions. The news that ADIDAS products shoes made from the plactic waste form oceans (http://index.hu/tudomany/2016/11/07/oceani_hulladekbol_gyart_cipot_az_adidas/) is rather marketing issue than of resource saving.

Whyle Hungary has not definite strategy on resource-efficiency, the report by EEA titled „More from less" (http://eionet.kormany.hu/download/3/36/71000/HUNGARY%20-%20final%20country%20profile%20for%20web%2021%20May%202016.pdf) states that several national documents and action plans cover the issue. The report, which is based on data from 2014 the volume and effectiveness of material use of Hungary is beneath the European average. Resource efficiency gives a developing picture, and it is hoped that this trend will be followed after the economic crisis as well – thanks to the transition towards green economy.

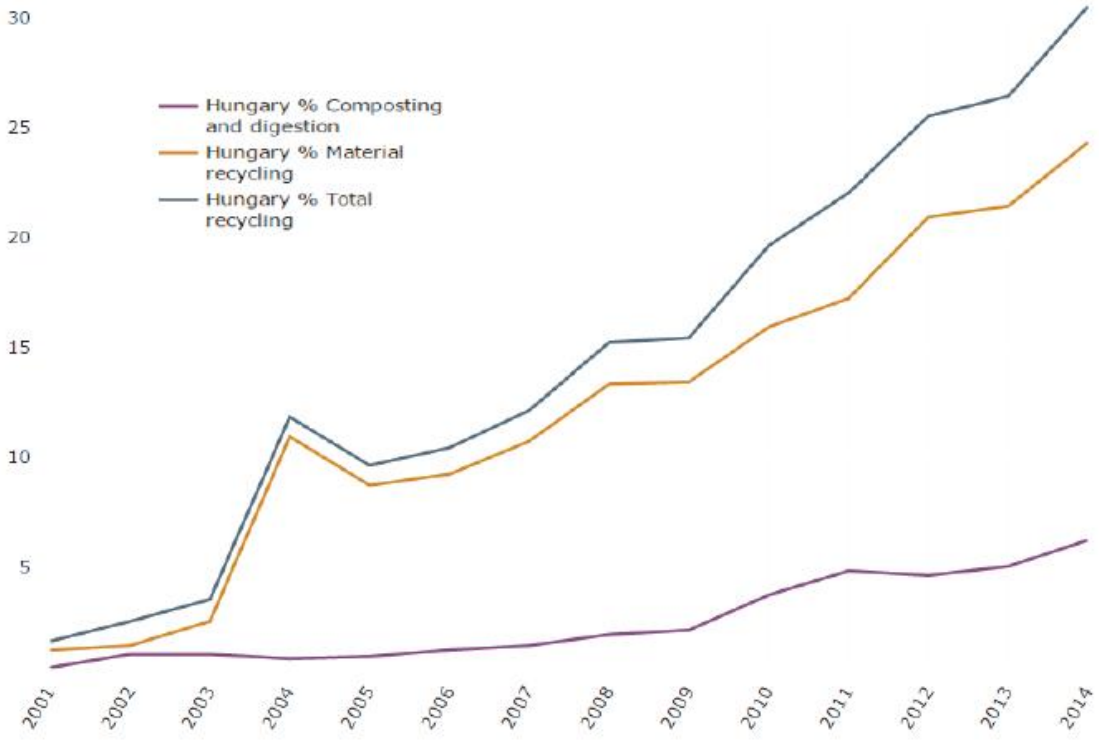


Trends in material consumption, Hungary by category (2000–2014)



Resource productivity (GDP/DMC), participating countries and EU-28 (2000, 2007 and 2014)

Due to data one of the most dinamic sectors of resource-efficiency is waste management. In the examined period the rate of reused waste grew manyfold.



Recycling of municipal waste, Hungary (2001–2014)

Suggestions

- Dissemination of reuse by swap parties (csere-bere börze), establishing and enhancing reuse centres. Besides, selective collection is also to be helped.
- Making it „trendy" to use second-hand products.
- Enforcement of co-operation with caritative organizations, channeling second hand products (clothes).
- Spurring fixing and reparing instead of „throw away" habits.
- Motivating the cluture of giving, sharing.

Good examples:

„Let's compost!" campaign in Kaposvár city distributed some 11,500 compost bins for the residents, aiming the mitigation of green waste. As part of the campaign community compost bin has been inaugurated in 2015 in the garden of the local kindergarten. By that time this was part of the ecological education, and the amount of waste has been decreased by one third (http://kornyezetbarat.hulladekboltermek.hu/hirek/1515/265668/20150410_kozossegi_komposztalas_kaposmenten_1.htm).

Community compost bin in a kindergarten (http://hulladekgazdalkodas.kaposmenti.hu/galeria/komposztkas-atadas_18.html)

The **e-reuse** (http://www.ereuse.hu/) has been the first reuse centre in Hungary. Electronic products are examined carefully, cleaned, fixed if needed and tested. Then they are merchandised in the shop or via internet – household appliancies, computers, electronic devices, DIY tools and toys. Guarantee is offered for all fixed and sold items.

e-reuse *(Resource of photo: http://circularfoundation.org/)*

Repair Café (https://www.facebook.com/repaircafehungary/) offers expertise for fixing household utensils. Those who can not fix a radio or repair clothes ask for help, while others (seniors, ignored by labour matket, or simply volunteers) can give a hand (electricians, sewing women, tapestry workers or others).

Repair Café *(Resource of photo: http://circularfoundation.org/)*

Old Bule (http://oldblue.hu) carpets, doormats, bags, clothes, t-shirts, gifts, pillows – all made form second hand clothes. All products are special and unique.
For producing one bule jeans some 10m^3 water is needed. This (production of cotton) caused the drying up of several rivers. About one billion blue jeans are produced yearly, and the aim is to reuse more and more.

Dress at fashion show – made from second hand jeans

(Resource of photo: http://circularfoundation.org/)

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