

## ALTERNATIVE SOLUTIONS TO OIL USE – GREEN ENERGIES

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**ABSTRACT:** The increase in oil price, together with estimates according to which the existing know oil reserves will be reduced by half in the next 15 years, forces the developed country to consider the regenerative energy resources. Almost the whole world depends on oil for the energy production. It's a prejudice to believe that we can not live without oil.

Using of a large scale power generators based on aeolian power or photovoltaic cell, fields, ulterior directly linked with the energetic net work or indirectly used to produce hydrogen for cars, world do the something. Using only some y these solutions, the level of gas emissions that produce the greenhouse effect could stabilize by 2050.

The main solution to limit the environmental factors pollution is decreasing oil dependence by replacing it with regenerative energy sources with no or very low pollution effects – green energies.

### АЛТЕРНАТИВНИ ИЗТОЧНИЦИ НА ЕНЕРГИЯ – ЗЕЛЕНИ ЕНЕРГИИ

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**РЕЗЮМЕ:** Нарастването на цените на петрола, както и предвижданията относно съществуващите петролни ресурси, ще намали неговото потребление почти наполовина през следващите 15 години. Това обстоятелство принуждава развитите страни да помислят за алтернативни енергийни източници. Почти целият свят разчита на петрола като енергиен източник и това води до убеждението, че ние не можем да живеем без него.

Светът, обаче прави нещо, като използва мощни енергийни генератори на базата на вятърни мощности или слънчеви батерии, област, която в бъдеще пряко ще бъде свързана с енергийната мрежа или индиректно, използвана за производство на водород за автомобилите. Прилагането само на някои от тези приложения ще намали нивото на газовите емисии, които са причина за парниковия ефект, и който може да бъде стабилизирен до 2050 г..

Основното решение за ограничаване факторите, замърсяващи околната среда е намаляване зависимостта от петрола чрез замяната му с алтернативни енергийни източници, които са с по-малко замърсяващ ефект – т.н. зелени енергии.

### Introduction

The oil is a non-regenerative resource whose quantity will be higher and higher until it reaches a maximum point, called the oil peak, followed by an inevitable decrease in extraction.

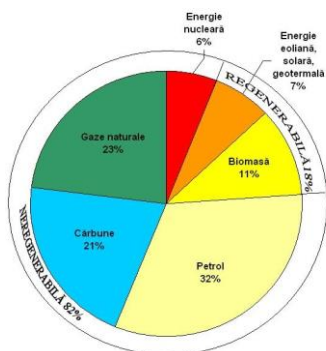


Fig. 1. Percentage between non-regenerative and regenerative energy

The increase in oil price, together with estimates according to which the existing know oil reserves will be reduced by half in the next 15 years, forces the developed country to consider the

regenerative energy resources. Romania wants the electric energy consumption to reach a value of 33%, of the interval aprox. 28% and exclusively relying on the energy produced in hydroelectric power stations. Almost the whole world depends on oil for the energy production. It's a prejudice to believe that we can not live without oil.

The advantages are huge: no more massive expenses for prospecting and extraction, no more oil dependence in the "hot" areas lower pollution; avoiding some climate changes.

The simple, correct heating, cooling or illuminating the buildings or the application of a large scale of the euro procedures that can double the efficiency of fuels in cars could dramatically reduce oil consumption. Using of a large scale power generators based on aeolian power or photovoltaic cell, fields, ulterior directly linked with the energetic net work or indirectly used to produce hydrogen for cars, world do the something. Using only some y these solutions, the level of gas emissions that produce the greenhouse effect could stabilize by 2050.

The costs are high, but it is essential that these technologies already exist. It has been demonstrated that such methods, used in an organized way, can produce high quantities of regenerative and non-polluting energy and can bring at the same time an immense stimulus for economy, being efficient in long-term costs.

Similarly, the main solution to limit the environmental factors pollution is decreasing oil dependence by replacing it with regenerative energy sources with no or very low pollution effects – green energies.

## Alternative solution that can be applicable in order to replace oil.

### "Synthetic" oil obtained from coal.

Coal can be used to produce synthetic oil by a process called "gasification". But synthetic oil will only attenuate the close energetic crash resulting from: insufficient resources (coal reserves are not very high, according to some estimation for only 250 years more this prediction means the utilization of all types of coal from lignite to anthracite; the use of coal to produce other fuels will rapidly reduce this estimate to a few years; we lose an important part of the coal to produce synthetic oil, coal production will reach its maximum in 20 years at the most); twice more energy will be needed to extract coal than the one given by the coal; to use coal on such a large scale will lead to a dramatic global warming.

### Thermal depolymerization

This intriguing solution implies the obtaining of oil from waste materials, but as most of the raw materials (rubber, plastic objects) need important oil quantities to be produced, it's more like an in high tech oil recycling, than a solution to its permanent crisis.

## Solar energy

Solar energy is the most natural, abundant, and inexhaustible on a time scale, the most available, the cleanest, being the only type of non – pollutant, waste less energy.

Solar energy results from solar radiation which produces electric energy based on photovoltaic technology or thermo energy through thermo-solar conversion methods. This, it can be used on a large scale to the same as thermo energy and electric energy.

Thermo solar energy can be exclusively used for warming the homes and the running water. The deviant for a thermic capitation of solar energy is placed on south – oriented roofs, the ideal inclining of the solar captators varying, between 45° to 60° (approx. equal to the place's geographic latitude). The simplest thermo solar captators are made of a black plastic carpet ("solar carpet") which transfer the heat absorbed from the sun (usually water and antifreeze). The thermo agent continuously circulates through blackened copper pipes displayed under the carpet and protected on the superior part by a glass board which creates the greenhouse effect. (fig.2.)



Fig. 2. Advantages and disadvantages for using active and passive solar energy for room-heating.

The conversion of solar energy into electric energy can be done through direct conversion (when solar radiation incident on a certain material-silicon-produces through photovoltaic or thermoelectric effect, the release of valence electrons from it's and makes it's participation to electric conduction.

Photovoltaic cells are less efficient: all solar bands in the world results in (the) (an) the energy of a coal thermoelectric station (500MW). In every photovoltaic cell, a lot of technology is invested (rare metals extraction, silicon), a technology that used oil. Reality shows that more energy is needed for creating a photovoltaic cell (fig.3,4)

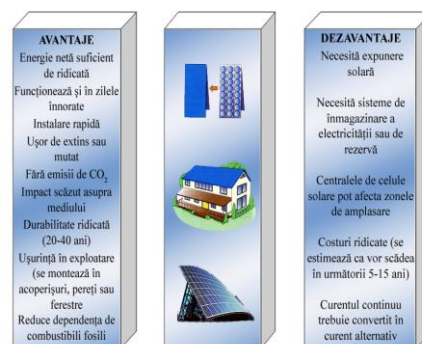


Fig. 3. Advantages and disadvantages of using photovoltaic cells to obtain electric energy

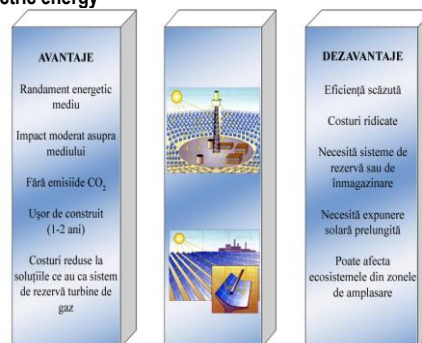


Fig. 4. Advantages and disadvantages of using solar panels to obtain electric energy and heat

## Aeolian energy

It results from transformation and delivery into the energetic system or directly from local consumers of electric energy that comes from the energetic potential of wind.

Geographically speaking Aeolian energy world have a strong impact because the wind is free and inexhaustible.

But, the energy produced by Aeolian energy does not generate the same electric energy as a thermoelectric PowerStation (13000 Aeolian turbines are needed to generate the same electric energy a thermoelectric PowerStation of 500MW). Moreover, Aeolian and solar energy is not a type of transportable energy like the one given by oil and under no circumstances can it ensure the present transport network: trucks, ships, planes (fig. 5)

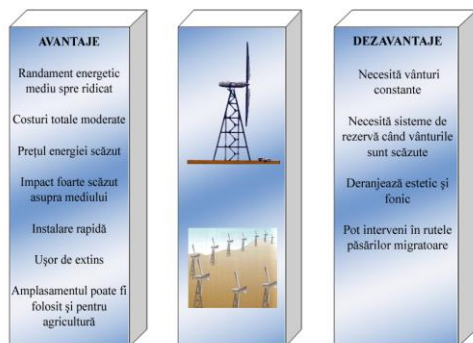


Fig. 5. Advantages and disadvantages of using wind to produce electric energy

## Biomass

It represents the bio fraction of products, forestry or linked industrial sectors, including vegetarian and non-vegetarian matter, as well as the industrial and urban waste. (fig. 6.)

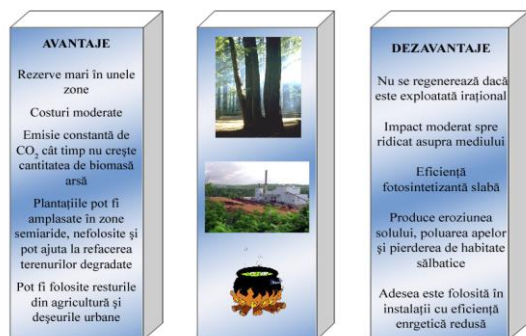


Fig. 6. Advantages and disadvantages of using biomass

Bio fuels (bio diesel, ethanol, and methanol) are obtained from agricultural waste, technical plants.

Drained oil, burnt kitchen oils the ethanol obtained from cereals, sugar cane or fruit fermentation can gradually replace oil as a source of energy for the world's energy.

Bio diesel (produced from rapeseed) is considered to be better than the Ethanol, but with a rate of returned energy of 3 to 1 which cannot compare to oil which has a rate of 30 to 1. These fuels from plants don't ask for a change in the technology auto engines production (like the hydrogen or the solar energy).

Agricultural waste available for the conversion of ethanol include waste such as wheat straws, maize, rice etc – which contain significant quantities of sugars, especially amidon - while whole waste include recovered wood, wood waste.

Using this agricultural waste (wooden) as well as the ones from the household for the ethanol production led to a higher decrease than other fuels of greenhouse gas emissions.

## Hydrogen

Auto vehicles are the main pollutant factor of the air. Oil resources, auto fuels are based on, are limited (fig.7.)

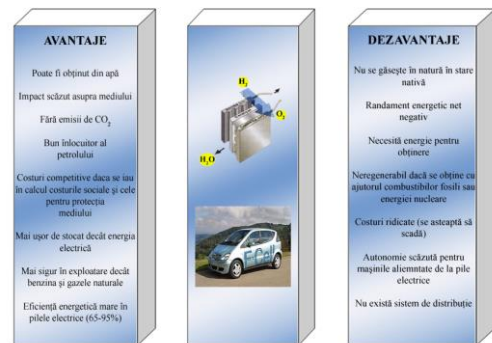


Fig. 7. Advantages and disadvantages of using hydrogen as fuel for vehicles and heat and electric energy production

Because of some inconvenience regarding the lack of the necessary resources for the proper functioning of internal combustion engines, as well as because of the environmental pollution, auto vehicles propelled by electric engines powered by lead batteries appeared. Even if the battery is a convenient source of electricity used in multiple purposes, it is consumable and has to be changed after a relatively reduced number of charge-recharge cycles.

An electric engine based on lead batteries has the advantage that the pollution level is low, easy to use and maintain while battery charging doesn't need sophisticated devices.

The drawbacks of electric storage in batteries electrically propelled vehicles can be diminished by generating electricity from fuel cells. Further research led to the idea that vehicles with hydrogen based fuel cells can be a pertinent alternative. Fuel cells work by combining hydrogen and oxygen in a chemical reaction to generate electricity not needing conventional pollutant engines. Vehicles with fuel cells have the following characteristics:

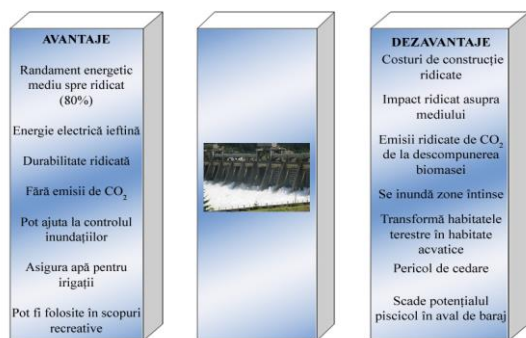
- Fuel cells don't have mobile components to need lubricants.
- Noise is lower while functioning being determined only by the air compressor and the cooling ventilator.
- They are much more comfortable than conventional vehicles as they lack gears.
- Energy production is no longer limited in the Carnot cycle.

This new direction of car industry was followed by big car manufacturers such as General Motors, Honda, Toyota, Ford, Opel.

The main drawback of this propulsion for vehicles is storing hydrogen which can only be done in pressurized recipients. Creating a distribution of hydrogen of the air.

## Geothermal energy

It results from the energy stored in subterranean hydrogeothermal deposits, exploitable in conditions of economic efficiency (fig. 8)



**Fig. 8. Advantages and disadvantages of using geothermal energy to produce electric energy**

It can be obtained in powerful hydro energetic stations (>10MV / unit hydro) a less powerful (<10 MV / unit hydro) as follows :

- Powerful hydro energetic stations (34.000 W / year)
- Less powerful hydro energetic stations (6000 GW / year).

## Conclusions

Using oil has to main disadvantages:

- 1) It is a limited natural resource
- 2) It is polluting

Because the industry is mainly based on oil it is difficult to replace it in a short time. But the practice has proven that there are many alternatives just waiting to be put in use.

Not all the alternative sources of energy are 100% non polluting because somewhere energy is needed to produce the equipment that produces the energy.

Solar energy is the most natural, abundant, and inexhaustible on a time scale, the most available, the cleanest, being the only type of non – pollutant, waste less energy. Unfortunately solar panels are very expensive equipments.

Aeolian energy results from transformation and delivery into the energetic system or directly from local consumers of electric energy that comes from the energetic potential of wind.

Bio fuels (bio diesel, ethanol, and methanol) are obtained from agricultural waste, technical plants.

Fuel cells work by combining hydrogen and oxygen in a chemical reaction to generate electricity not needing conventional pollutant engines.

These “green” energies are not at all 100% ecological but they represent strong alternatives to be considered when thinking of reducing the use of oil.

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