

Hypothesis:

In any physical or chemical phenomenon some form of energy intervenes, it can be; chemical, electromagnetic, magnetic, electrical, kinetic, potential, sonic, solar, static etc.

The principal approach of this work is related to the capacity of production in the field of the energy in general, as well as the importance and the worry in the conservation of the same one and its effect in the pollution and the climatic changes.

The first information to be analyzed will be undoubtedly a brief definition on the meaning of the energy, as well as the different classes in which it appears.

Later I will proceed to analyze the quantity of resources estimated in the world and present the reasons and importance the saving the amount of consumption in general. Then, and certainly when we speak over the conservation of the energy, is almost impossible to forget about the effects of pollution that have led us to suffer even extreme climatic changes as the already known greenhouse effect and the most important plans of conservation to also regulate the energetic market.

Across the years, the debate about energy and the importance to arouse the population have been characterized by its constant campaigns full of failures. Since its abundance, as well as the capacity of the people to pay it, and the right to have has it based on its need, has been the principal enemy both for the countries and for the ecologist groups. And that's why, in both the area of the electric power as well as the petroliferous sector the following question relapses since on these two markets the increase in its use is a multiplier that year by year seems not to have end.

Up to where and what actually defines the need of energy of a person? And how to measure and regulate the quantities that really satisfy their necessities?

DEFINITION OF ENERGY:

Energy, is the capacity of a physical system to realize a work. The electromagnetic relation possesses energy that depends on its frequency. The energy associated with movement is kinetic and the one associated with its position is potential. Energy is demonstrated in several forms; mechanical, thermal, chemical, electrical, radiant and nuclear or atomic. All the forms of energy can be converted into others by means of the correct processes, in the process of transformation; energy can be lost or gained.

The transformations that need energy in order for the chemical change to takes place are called endothermic and those that give off energy call themselves exothermic chemical transformations.

The observations of the XIX century led to the conclusion, of which it is neither possible to create nor destroy energy, it can only be transformed. This concept is known as principle of the conservation of the energy. When the speed of matter comes closer to the speed of light the matter transforms into energy and vice versa; concept of relativity.

TYPES OF ENERGY:

Kinetic energy: Energy that an object possesses due to its movement. The kinetic energy depends on the mass and the speed of the object. Its formula is:

$$E = (ma) d$$

Potential energy: stored energy that a system possesses as a result of the relative positions of its components. To provide potential energy to a system it is necessary to realize a work. Every single object has potential energy depending on the work realized on the object. E.g. shooting a soccer ball; its potential energy depends upon how hard you shoot it.

The relations between the kinetic energy and potential energy, and among the concepts of force, distance and acceleration, can be illustrated by raising an object and letting it fall down. When the object is suspended it has potential energy, and when it falls it becomes kinetic energy.

Water power: Is defined as the energy that is obtained of the fall of the water from certain height to the lowest level and provokes the movement of hydraulic equipment such as wheels, engines or turbines. The hydroelectricity can be found and used in environments where large quantities of water are available.

By the year 2002 the hydroelectricity represents the fourth part of the total production of electricity in the world. Though it's more expensive to support a hydraulic head plant, the advantage is that can be renewed. The water power every time takes greater diffusion in the world, rivaling with the oil.

Solar power: Energy produced by the sun as a result of nuclear reactions. The intensity of the solar radiation is called solar constant. The intensity of real available energy in the terrestrial surface is less than the solar constant due to the absorption, and to the dispersion of the radiation.

Almost 30 % of solar power that comes to reach atmosphere languishes in the hydrological cycle, which produces the rain. Thanks to photosynthesis, the solar power contributes to the growth of vegetable, plant life (biomass). Other fuels such as alcohol also can be extracted from the biomass.

How the solar power is gathered: to directly obtain solar power there are needed artificial devices called solar collectors, designed to gather energy. When the energy is gathered it is used in thermal or photovoltaic processes. The solar power can be converted into any type of energy if we use the suitable process.

Renewable energy: Also called alternative energy, this meaning covers a series of energetic sources that theoretically are not known if they would exhaust with the passage of time. These sources can be really interesting alternative since they would also produce a minimal environmental impact. The renewable energies known now are: Wind, Biomass, Geothermic, Demy-semi-quavers, Hydrogen, Waves, Thermal you give seas, Seas, Vegetable and plants Oils, as well as Alcohol, Natural Gas, colic etc..

Nuclear power: Energy liberated during the fission or merger of atomic nuclei. The quantities of energy that can be obtained. The Nuclear power can present a real solution for almost every kind of energy. However in past experiences building nuclear plants, the necessary precautions were not taken, and in almost 50% of the cases it ends in a catastrophe.

In these next pages we will focus on the importance of saving the energies of conventional type like: Hydroelectric, Oil, Coal and Electricity, since those are the ones that have caused more controversy, disorder, problems and conscience in our society.

THE CONSUMPTION OF ENERGY

The energetic demand, modest up to the beginning of the 20th century, when it increases drastically before the First World War, later became stable during the next quarter of a century. After 1945, the demand increased more rapidly, to a level that overcomes that of eighties.

Besides the role of the diverse sources of energy was modified along the decades. The wood, which was representing 90 % of the energy used in the world in 1820, was not representing anything more than a sixth

part in 1913. Wood was replaced from the year 1850, by coal, which began its reign for approximately half a century.

The energetic power of the hydrocarbons became more popular when the petroleum companies, on having had important reserves, started practicing a policy of low prices by 1971. The energy of nuclear origin, because of this increase, stopped in the middle eighties.

With regard to the world, very unequal consumption among countries and economic blocks, since 90 % of the energy was consumed by the industrialized countries (30 % of the world population), the diverse sources provided in 1984: the oil, 39 ' 5 % of the emaciated energy; the natural gas 19 %; the coal, 31 ' 1 %; the nuclear power, 3 ' 7 %; the hydroelectric energy, 6 ' 3 %.

The countries of the C.E.E. (Included Spain, Portugal) had an energetic dependence of the oil of 46 % in 1986, with an energetic plan it to reduce it to 40 % in 1990; while the nuclear power was representing a contribution to the electrical production of 21 % in 1983, it was promoted to 30 ' 7 % with the community of the EURO.

There are also other effects that interfere with energy consumption as the extreme climate that some countries like Canada has to face, and the different industrial processes used, as well as the effects of demography, geography, activity, lifestyle, and natural resources.

OIL AND NATURAL GAS

The word raw is typical to designate to the oil before its being refined. The composition of raw is very changeable depending on the place in which they have been formed. Not only the raw is distinguished between each others because it's different proportions in the different fractions of hydrocarbons, but also because they have different proportions of sulphur, nitrogen and of the small quantities of diverse metals, which have great importance from the point of view of the pollution.

Oil reserves and Natural Gas

It is possible to find oil and natural gas in all the continents distributed of very irregular form. Enormous oilfields that contain about the half of the world oil are in the Middle East. Also quantities of oil exist big in the Gulf of Mexico, North Sea and the Arctic (both in Alaska and in Russia).

There is thought that there must be notable reserves in the continental platforms, though by diverse problems the majority of them are still not located and exploited. It is very difficult to estimate for how many more years we will have oil and natural gas. It is difficult to do this calculation because it depends on many unknown variables.

We do not also know of all of the new deposits they are going to reveal. This is going to set the pace of consumption, because it is probable that when they are skimping and its prices raised we will pawn other alternative sources of energy and its pace of consumption diminishes.

In 1970 there were reserves known that contain oil for approximately 30 years (until the year 2000) and of natural gas for approximately 40 years. On the other hand in 1990 there were sufficient deposits of oil located for another 40 years (until 2030) and of natural gas for approximately 60 years; that means, in these years it has revealed itself more than it has languished. For all that it is possible to say that there are reserves for up tens and 100's of years. Another important problem related to the oil is that languishes for the most part in regions where it is not produced. This way among The United States and Western Europe languishes almost the half of the world oil. The countries of the Persian Gulf that only consume 4, 5 % world produce, on the other hand, 26 %.

This difference will worsen in the future because most of the new reserves are discovered in the least consuming countries. This way it is calculated that the United States has reserves for approximately 10 years or Europe for approximately 13, whereas the Gulf States accumulate 57 % of the known reserves.

Effects of the pollution

Environmental problems from the use of the oil and the natural gas.

The pollution caused by producing combustible resources is the same as the pollution caused by using them. One of the most studied problems at present is the one that arises from the immense quantity of CO₂ that we are emitting to the atmosphere on having burned the fossil fuels. Since we studied closely, this gas has an important greenhouse effect that may provoke a catastrophic global warming of the entire planet.

Another negative impact associated with burning oil and natural gas is the acid rain, in this case not so much for the production of oxides of sulphur, like in case of the coal, but especially for the production of oxides of nitrogen. The damages derived from the production and transport take place especially the when oil is spilt, accidental or not, and for the work in the refineries

Most energy today comes from burning fossil fuel to make electricity, run factories, power vehicles and heat homes. Fossil resources such as coal, oil and natural gas are being consumed so fast as to be largely exhausted during the next century. Each year fossil fuel waste adds 25 billion tonnes of carbon dioxide to the atmosphere. This equates to 70 million tonnes each day or 800 tonnes a second. That considering that by 1995 the cost of every tonne of carbon emitted for the US was around \$5 to \$125 dollars, what is the price now? And how much differences will the use of filters that can control the levels of greenhouses and pollution?

To analyse the consequences from the rapid increase of greenhouse effect and gases, world experts are working through the UN's Intergovernmental Panel on Climate Change. The dynamics of climate change is complex. But scientists coincide that an increase in greenhouse gases causes nothing but more solar heat coming to Earth. This can also be explain by man-made greenhouse gases which have cause just in last 15 years, 10 warmest years in recorded history. The US release for example; a daily rate of 54 kilograms of carbon dioxide per person. In Europe and Japan, daily emissions per person are more than 50 pounds. And in fast-developing countries like China, with one third of the population of the world, the emissions already exceeds 13 pounds per each person. Humanity faces a future of radical change either in the way we produce energy or in the health of our planet.

Talking about pollution, agreements, Climate Change and its concern in today's world, it will be almost impossible to not mention the Kyoto Agreement.

Around 10 years from now, the world's governments agreed at the UN Framework Convention on the Climate Change, taking as a main topic, the excess of pollution in the world. In 1997, governments took a further step forwards and adopted the Kyoto Protocol. The Kyoto Protocol broke new ground with its legally binding constrains on greenhouse gas emissions and it's innovate mechanisms aimed at cutting the cost of emissions. By the year 2002, around 190 countries, including European Union are parties to the convention, more than most any other environmental treaty. However, a big problem that Kyoto faces is that third countries economy will never be able to afford the requirements of this Protocol and its regulations, which can influence more countries to make and excuse on its affordability and to move back.

But why those the regulation never became effective? The statement about pollution, world warming and shortage of those resources, has been enough evidence to prove the governments that we must act now, or nobody we will not know when will be too late, until we get there.

But personal interest, politics and corruption seems to be more important to the authorities of the world than

any of those issues, a big example of that can be Esso, one of the biggest oil players in the United States which has been accused to help and support the US with funds front groups that are aggressive and vocal advocates of an attack on Iraq. In fact, it has been proved already and published by the Wall Street Journal, that Esso Co. supplies the Pentagon with hundreds of thousands of dollars and has also been involved in dirty tricks campaign to subvert efforts to reduce US oil dependence and its impact on our climate. Documents procured through the US Freedom of Information Act demonstrate the role Esso played in removing the head of the UN's influential global warming panel.

And now with the World between Iraq–US, Esso has been discussing with Vice President Dick Cheney's the Iraq crisis. Why will Vice President Dick Cheney discuss Iraq and US war with an Oil company? Will a couple of Billion dollars and Esso's historic interest in Iraq oil fields help to explain the situation? I don't really know. However; the truth is that Esso, Oracle or any of those company's should not decide what is the best for us, when we are suffering a critical time life problem either for pollution or any other reason.

In the next table we will mention a couple of the greenhouse gases that became the priority of Kyoto, As well as the sectors and industries that produce them.

Greenhouse gases

Carbon dioxide (CO₂) Methane (CH₄) Nitrous oxide (N₂O) Hydro fluorocarbons (HFCs) per fluorocarbons (PFCs) Sulphur hex fluoride (SF₆)

Sectors/source categories

Energy: Fuel combustion, Energy industries, Manufacturing industries and construction, Transport, Other sectors.

Fugitive emissions from fuels: Solid fuels, Oil and, natural gas, etc.

Industrial processes: Mineral products, Chemical industry, Metal production, production, Production of halocarbons and sulphur hexafluoride, Consumption of halocarbons and sulphur hexafluoride, Solvent and other product use, Agriculture, Enteric fermentation, Manure management, Rice cultivation, Agricultural soils, Prescribed burning of savannas, Field burning of agricultural residues, Waste, Solid waste disposal on land, Wastewater handling, Waste incineration

WATER

The water is one of the most important resources of the human being. But how is this related to the energy? The water not only is the petrol of the body, but also he is the principal contributor in the growth of agricultural farming products in the field. Without the water the production of fruits, food, even our lives won't be possible.

The water consumption in the humanity as well as the oil and the electricity an element in which its consumption has become insolent, its production and renovation sources really poor and its demand really high, but not only in its consumption, since the water already in the oceans, lakes, rivers, cataracts, can be an excellent creator of electric power, if it is used with the suitable technology.

On the other hand, when we talk about the water, we can not forget about its effect on the pollution and its repercussion in the different sectors, economically, socially and of the environment.

A very clear example of its effect in the economy and its repercussion have been the fields and the third world countries, since they lack the qualities to control this boss of conservation and cleanliness.

Prove of that and the great Importance of saving the water is that Two non-profit environmental research groups; the Washington based International Food Policy Research Institute and the Pretoria based International Water Management Institute, used sophisticated computer modeling to project the fate of the world's fresh water sources and the repercussions of their disappearance.

The institutes found that by 2025 the world could see annual losses of up to 350 million tones of food, slightly more than the entire US annual grain crop, from lack of fresh water.

Water pollution is one of the most under researched aspects of economic damage. If the pollution of water keeps going at the same rate, it is estimated that water supply is going to decrease dramatically, declining by approximately one-third in by 2010, without considering that demand is expected to increase about 50% just in the US. Because rivers will have to carry away waste, reduced river flow leaves more waste to be removed by emission controls. US for example establish a base of \$64 billion dollars for water pollution in its country, just for the year of 2000. (In the world the effects of pollution have an impact of around 1.5–2.0 % of world GDP.) This can cause not just an economic impact but a very serious and potential effect on health.

WATER/ ELECTRICITY

For many thousands of years, humankind subsisted with little effect on the biosphere. Just 5 centuries ago, in the time of Europe's Renaissance, China's Ming Dynasty, and India's first Mogul Emperor. The world was still thinly populated. Since then spurred by revolutions in agriculture, industry and medicine, global population has grown nearly fifteen fold. Of today's 6 billion people, many millions enjoy an unprecedented standard of living.

But one third of humanity has no access to electricity, and still another third has only limited access. Huge populations exist in dismal poverty. Over 1 billion people are without safe water, and 2.4 billion lack adequate sanitation. Each day 40,000 people, 25 per minute die from disease that would be readily prevented by basic economic development. In the next 50 years as world population expands to 9,000,000,000 today's vast unmet human needs could multiply severely. Economic development is imperative not only to alleviate human misery but also to create conditions necessary to stabilise global population.

Today, in much of the developing world, a surging drive to meet these needs is generating an enormous rise in the use of energy. By 2050, global energy consumption will double. Will the world have the capacity to subsidize the whole population with this necessity (electricity, water, oil.)

Here's a sobering thought for the first summer of the new millennium: America is running short of electricity.

In pockets of the country, from New York to New Orleans, and from Chicago to San Francisco, shortages are likely to strike as the days lengthen and the temperatures rise. The East Coast got a taste of what's coming when a surprise heat wave hit this week just as many power plants were shut down for spring maintenance. Utilities and grid operators temporarily cut voltages, called on big industry to conserve and asked homeowners not to open their refrigerators too often.

In the old days, utilities generated electricity and delivered it to customers in exclusive territories. To protect consumers from gouging, rates were regulated. The result was tremendous reliability but also inefficiency and waste. Deregulation, now under way in 24 states, upsets that structure and allows new players, some affiliated with utilities, some not.

But it will be a waste of time and ink to explain every single detail of how the electricity has been waste and how the world is going to run out of it, if we keep going at the same rate. It will probably also be a waste of time look for lots of data and statistics just to said that company's like Oracle expend millions of dollars per hour so supply thousand of servers with electricity and contributing with almost 25% of the pollution in the

city of Redwood CA. without mentioning that by company's like this California has been suffering a big electric problem, and been on the extreme necessity of importing electricity from a couple of provinces in Canada and some states in Mexico. But the US is not the only country who suffers this problem, country's like Korea has been also acute electricity shortage.

PLANS OF CONSERVATION

More than Kyoto the problems of pollution is a serious issue in world. In places like Mexico City, the pollution by cars and factories is so high that just living there is worst than living with a smoker and worst than smoke. The pollution is getting so high that authorities have been on the necessity of regulate the cars by plates and don't let them circulate all week, but just 4 days. In fact, they went over 10 times higher of the levels of imecas (a measurement of pollution in air) with grades between 204 to 218. (Scales: 0–100 normal safe conditions 101–200 points not satisfactory conditions, and from 201–300 really bad conditions.)

There are many plans for energy conservation; however, there are also Natural Limits, technological, economic and behavioral limits that we should consider;

Natural: We need to improve or found a new kind resource that can improve our necessities and contaminate less.

Technological: Investment on research and development have to keep going, we need to develop a new productive and more effective way of using our resources.

Economic: Most of the times, the economic limits are the ones that prevents the attainment of the technological limits.

Behavioral: The long term future for conservation is largely depends on the course of energy prices. As long as energy remains a minor part of the total cost of individual, people will never learn to appreciate our resources and that will prevent a greater degree of conservation and effective use.

SAVING OF ENERGY:

I strengthen for reducing the quantity of energy for industrial and domestic uses. In other times, the energy was abundant, especially the wood and the mineral and vegetable coal. But since still today they continue being used, these and others (the wood constitutes 13 % of energy) and the consequence of it is that already this starting skimping in countries not developed. The efforts of the engineers to improve the yield of the machines, led them in 1824 to the creation of the thermodynamic laws, which are fundamental to increase the yield of the use of energy of fossil fuels. Under yield with which we generate our energy or promote our cars, it is a consequence of the physical laws more that the negligence.

Factors that improve the yield of energy: the Whole energetic system of the world was seen seriously affected in 1973, when the producers of oil quadruplicate the price of the barrel of oil. Then the people began to save energy and to use it more efficiently, obtaining a spectacular advance in the yield of the energy by the decade of 80's, this way new reasons have appeared for the yield of the energy: environmental motives, of pollution and of global warming.

Environmental pollution: In 1896 was discovered that the radioactive balance of the Earth was depending to a great extent on the protective cap of dioxide of carbon. The dioxide catches the infrared beams that go out of the Earth and it is the person in charge of which the temperature of the terrestrial surface is of approximately 31 degrees more warm than if it did not exist. This is very importantly, since without this greenhouse effect the majority of the serious water I freeze.

The case is that the energy of the world is exhausting and the organizations want to diminish its utilization if we do not want that the planet warms up.

Effective methods for saving energy: The saving of energy by means of the increase of the efficiency of its manipulated one can be achieved, across technological advances in the production of electricity and improvement of the processes in refineries. In Western Europe 40 % of the final consumption of energy it is destined to the domestic sector, 25 % to the industry and 30 % to the transport.

Energy in the domestic sector: More or less of the half of energy consumed in Europe is destined to buildings. It is necessary to stimulate the construction of designs with good isolation, the effective use of the energy in the lighting, the system installation of control of energy and that of modern and effective devices for the heating.

Energy in the industrial sector: The saving electricity can be obtained by means of advanced systems of control of power, the installation of electrical engines for ventilators, pumps, mechanisms of transmission; also it is necessary to avoid the penalty that supposes the use of energy in moments of maximum cost. And another good method is to recover the rejected heat.

PREVENTING CLIMATE CHANGE

Stabilising the accumulation of atmospheric greenhouse gases requires that worldwide emissions be cut by more than half. Developing countries embrace conservation and clean-energy technologies, their enormous populations will soon emit more greenhouse gases than the existing industrialised world. In order to 'make way' for these increased emissions and reducing the global total, today's industrialised countries must cut emissions by 75%. The world urgently needs a massive introduction of low-emission energy technologies. Electricity can be a direct energy with a really low emission of pollution. Big cities can start using electricity, electrically charged batteries, and fuel cells using electrically produced hydrogen. But electricity is only a way of distributing energy. The key is to generate vastly expanded supplies of electricity *cleanly*.

But even if this works, the electricity industry, development and research centres need more attention and support. Environmentalists have played a valuable role in warning that catastrophic climate change is a real and imminent danger. It is crucially important that they be equally realistic about solutions. Nuclear power, like wind, hydro and solar energy can generate electricity with no carbon dioxide or other greenhouse gas emissions. The critical difference is that nuclear energy is the only proven option with the capacity to produce vastly expanded supplies of clean electricity on a global scale.

NUCLEAR PROBLEMS

Nuclear plants can be a wonderful alternative for energy conservation and pollution control. The only problems are that the few nuclear plants that were built in the world were also closed because the huge number of catastrophes that those cause.

In Canada for example the nuclear power plants have been plagued by problems like: Extremely high costs, erratic performance and technical problems, the fact of radiation if they are not manage and control properly.

OTHER OPTIONS FOR ENERGY CONSERVATION

We can also improve the energy consumption with new products, using technical innovation and implementation of new technologies, changing or switching fuels that will last equal but contaminate less.

Improvement of energy productivity by substituting energy capital and labor, or implementing a system that approaches matching supply and demand. Our behavior as consumers is as well a huge factor; people can

improve their consumption by using smaller cars, improve land space used and effectiveness, less electricity in home or as simple as taking care of the water.

Considering also that goods and services are based on a combination of capital, labor, and resources (C, L, and R), each of them with a cost. Although, when economic efficiencies are discussed, it is important to know which costs are being considered and how they are being measured. Since waste, like efficiency is subject to various interpretations. Economic waste depends strongly on the price of energy and the cost of alternative ways of provided; therefore, if energy were free it will be by definition, no economic waste.

Finally, we can conclude saying that no matter how much the investments and research progress increase, the only way to control the pollution and protect the environment is to take conscience every time we use it. Even if we found a new methods for wasting less, but people don't care more, the levels of pollution will never go down. We don't have to wait until the economic factor or extreme conditions lead us to take a decision, take action and taking care, we don't have to wait until it gets too late.

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