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THE ENERGY SOURCES AND NUCLEAR ENERGY

The point of view of the Belgian Catholic Church

by

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The problems related to the environment are reported regularly to the public by means of the newspapers, on radio and television. The story is the product of a journalistic process and in general does not bear much resemblance to the original event. The rate and type of reportage depend not only on the body of data available to the journalist but on the information sources the journalist chosen to use. The same story is reported in a positive or negative way. Finally people are overwhelmed by contradictory information and became uncertain or frightened.

Getting objective information is very important. Therefore to have a clear view concerning the use of the energy sources and in particular nuclear energy, the Lord Bishop of Bruges, his Lordship Roger Vangheluwe, decided to set up a special working group to evaluate the problems concerning energy production, especially nuclear production. I was appointed by his Lordship as chairman of the working group. The working group was made up of experts from different disciplines such as science, theology and philosophy, teachers and representatives of the general public. The "Working Group for Ethics and Nuclear Energy" of the Diocese of Bruges made a comparative study of all energy sources and submitted the results to ethical Christian standards. Today the working group is still active.

In order to provide the general public with objective information about nuclear energy in particular and to made a statement about the position of the Belgian Catholic Church concerning this matter, the results of the study were published in Dutch under the form of a book with the title "The Energy Sources and Nuclear Energy - Comparative analysis and ethical thoughts" written by myself, by order of the Lord Bishop of Bruges. The French and English versions are in preparation. The Dutch version of the book is published by ACCO (Academic Co-operative) - Leuven (Belgium).

My aim here is to give a short survey of the results of the study and to present the point of view of the Belgian Catholic Church in the energy debate.

Energy is a *universal wealth* the divine Providence has provided to the whole of mankind, regardless of the continent. Energy sources can not be used without respecting moral laws. We must take care of the quality of life of our fellow men, as well as that of the future generations. We can not make the future intolerable, but neither can we contain it excessively due to a small number of damaging effects.

We can not take unfounded risks for man and his environment when producing energy. Risks must be kept as low as reasonably possible (the ALARA principle: As Low As Reasonably Achievable), nowadays and in the future. The same risk norms must be applied to both the present and future generations. Respect for human life and the environment is one of the main requirements linked to any human activity.

The production of energy exploits *raw materials* that are *not inexhaustible*. On the basis of the demonstrated reserves (they comprise the identified layers that can be exploited in a sound technical and economic way using modern technology) and the consumption of energy in 1995, there should be enough different types of energy reserves left for about one century. This conclusion draws a rather dark picture for the future. The uranium reserves are also limited, but depending on the consumption options, the reserves of fissile materials could be extended significantly (even by a factor of 50 to 60 when exploiting breeder reactors). The thorium reserves are as large as those for uranium and should also be taken into account. Fissile materials, including thorium, could play an important role in the production of electricity in the future.

We must *deal carefully with energy and raw materials*. It is our duty to make sure that the future generations will dispose of sufficient raw materials and technology to fulfil the demand for energy. This generation must solve the current energy problems and perform the necessary research and investments so as

not to shift the problems to the coming generations. We must, without delay, use energy rationally: it is the *ethical obligation of our generation* because energy shortage involves economic decline and poverty.

One of the energy sources that influence our way of life is *electricity*. We only realise what it really means when it is accidentally lacking, when there is a power failure for example. The three following primary energy sources are up to now being used to produce electricity :

- fossil fuels such as coal, natural gas and mineral oil;
- mineral materials that use nuclear fission in heavy metals such as uranium and thorium;
- renewable energy sources such as water, wind and sun.

The fossil fuels remain the primary source of the total energy supply in the world.

The world-wide consumption lies as high as 8 billion toe a year, of which 87% are fossil fuels, 6% *nuclear energy* and 7% hydraulic and renewable energy sources. The electricity makes up 36% of this total and is split up into 10% mineral oil, 16% natural gas, 38% coal, 17% *nuclear energy* and 19% hydraulic and renewable energy sources.

The geographic distribution of consumption allows us to draw a very sharp picture of the energy problem. North America and Europe cover more than 50% of this consumption in comparison with, for example, Africa with a mere 3% and which has a strongly growing population.

It is clear that the difference in energy consumption between the involved continents goes together with a difference in welfare. But we must also pay attention to the substantial cultural differences between the continents. Maybe these populations do not wish to live in the same way as we do. It is their full right to decide themselves on this matter. It is, however, our duty to provide them with the possibility to make use of our achievements on the level of hygiene, health, safety and material comfort which are essential conditions to achieve welfare and well-being.

In addition, the growth of the population during the next hundred years will exclusively take place in these already underdeveloped continents. It could mean that the present six billion people on this earth could double.

Considering these elements, the energy demand could, compared to the current situation, increase by 300 % over the next century. Can our planet cope with this?

Let us now analyse *the impact on the environment* that is incurred by this increase in energy. Through the energy production on a large scale, substances are freed into the environment in liquid, gas or solid form, which can have negative effects for mankind. The combustion of fossil fuels mainly puts a burden on the air, a vital source of life for mankind. CO₂, NO_x, SO₂, fly ashes, and dust are elements which all have a specific negative effect. CO₂ is related to the change of climate due to the greenhouse effect. The gases CO₂, NO_x, SO₂, fly ashes, and dust can cause cancer and lung diseases. These gases are responsible for acid rain that has a major negative influence on the state of the forests and disturbs the balance in the CO₂ household.

The combustion of fossil fuels gives off yearly around 27 billion tonnes of CO₂ in the atmosphere. The production of electricity is responsible for about 30% of this. The contribution of nuclear energy in the world production of electricity amounts to 17%. This prevents the emission of around 2 billion tonnes of CO₂. Between 1990 and 1995, the annual emission of CO₂ increased by about 12%. All the measurements carried out up to now show a strong increase in the concentration of greenhouse gases in the atmosphere. Human activities influence the environment 90 to 100 times faster than nature. The accelerated increase of the carbon dioxide concentration is worrying. The rapidity with which the human being affects the environment, as well as the degree of this disturbance, justify the fear of an irrevocable climate change. *The accelerated increase of the concentration of carbon dioxide is a problem that must be solved primarily and on world-level.*

The production of electricity using nuclear energy, does not cause acid rain and does not increase the greenhouse effect. Under normal circumstances, it leads to small emissions of radioactive substances in the environment and very low levels of radiation for the population. The natural background radiation which we are exposed to annually and which comes from natural sources, is only increased by one or two thousandths unit through electronuclear production. Can we continue to be blind to the probable real risk of climate change as a result of the emission caused by the combustion of fossil fuels?

The use of nuclear energy to produce electricity generates radioactive waste, but in relatively small quantities. The modern technologies allow the safe storage and disposal of the volumes of radioactive waste that are being produced without any danger of contact with the environment and the human being. With time, radioactivity decreases naturally. A good deal of this waste actually loses its radioactivity in a relatively short period of time. The problem caused by radioactive waste, is from a technical point of view, not bigger than the problems raised by industrial or household waste. Radioactive waste has no difficulty in sustaining the comparison with chemical and mineral toxicity's such as heavy metals which are dumped in nature. *The real problem is mainly political and psychological, it concerns the acceptance by the public of the disposal of radioactive waste.*

For Belgium which is a large consumer of nuclear energy (60% of the total electricity production), the annual electronuclear production per inhabitant only results in the quantity of a small can of beer of low-level waste and a thimbleful of high-level waste. Does the management of this limited quantity of waste weigh enough so as to give up nuclear energy?

In comparison with other industrial activities and taking into account the massive use of nuclear energy (at the end of 1997: 437 nuclear reactors in service producing 17% of the electricity consumed in the world), we can say that the security balance is very positive. In the Western countries, the nuclear industry heads the other industries security-wise. No other industry manages the risks as well. There exists, moreover, a real „*safety culture*“ in those countries. The preoccupation to ensure the security comes first and is present everywhere. A zero risk does, however, not exist and there remains a potential for incidents and accidents within this safety culture. But this safety culture does ensure that the impact of these incidents or accidents is reduced as much as possible.

Nuclear energy is justified from an economic point of view, as it can be used to produce electricity at a stable and relatively low cost. The price for the kWh covers, moreover, all of the costs, including the dismantling of the facilities, the management and the safe disposal of the waste.

Nuclear energy is given a biased approach, evaluated and found wanting for reasons which are not applied to other industrial activities. *Is the disapproval of nuclear energy morally justified for the future generations?*

The combustion of fossil materials is a waste. Coal, mineral oil and especially natural gas are first of all raw materials used for food, staple crops, medicines, etc. The future generations will blame us strongly for having squandered those precious raw materials in this manner. Uranium and thorium, however, can only be used for the production of energy. Is it not appropriate to retain nuclear energy so as not to exclude any possibility in the future?

Banning military applications of nuclear energy does not justify its banning for civil applications. Giving up civil nuclear energy does not remove the risks of proliferation.

The debate about nuclear energy must be placed in the global context of „energy supply and means of production“. The reaction during debates is often instinctive, in other words, immediate and based on prejudices with a strong emotional content. It shows our involvement and commitment, but it does not free us from looking for an objective judgement based on precise facts and information.

Creating a radical and exclusive opposition between nuclear energy and respect for the human being and the environment, is wrong. All the technologies, which are used to produce electricity, whatever the energy source, have both advantages and disadvantages and carry certain risks. It is sufficient to compare them. Nuclear energy sustains this comparison very well.

Nuclear energy belongs to the potentials of this world. Mankind is responsible for using it in an ethical responsible manner. Safety constitutes a priority in this case.

The choice is up to us based on a thorough knowledge of the problem!