

The importance of fusion energy research for UK.

I am a physicist concerned about the future of our energy supply. I have spend considerable time studying the various energy options and their future prospects. I have decided to devote myself to fusion research because it is clear to me that we will need all possible options for energy production in the future, and fusion is one of the few very important and promising possibilities. I am actually leading a group of about 100 scientists from all over Europe and together we further develop on JET plasma scenarios for the next step machine, ITER, a prototype fusion reactor, which needs to be built in the very near future.

The availability of a continuous and affordable energy supply is a major factor determining the quality of life. Machines are making life much more comfortable for mankind by carrying out boring and time consuming routine tasks. Transportation also, has never been so easy as in the last decades allowing a rapid exchange of goods and people. A decreased availability together with an increase in the cost of energy will not be easily swallowed by the population, and are likely to cause great social and political instabilities. A small example was highlighted in September last year, where in fact a very small increase in the price of fuel caused a major disruption in the countries' traffic, further enhanced by protest actions at refineries. It makes one really afraid of scenarios where the energy price would double on a short time scale, which will certainly happen as soon as a real imbalance between energy demand and supply would set in.

The importance of greenhouse gases in determining the world climate has again been confirmed recently in the latest report of the IPCC, stating that the original predictions of the past years are actually underestimating the real situation. A serious reduction of greenhouse gas emissions is an absolute must. The Kyoto agreement tries to address this but is only a little way in the correct direction; in fact much more drastic measures should be taken. Already this first small step is causing major havoc: the Kyoto agreement is a failure, as no country can keep up with the promised quotas, and moreover large countries (and thus also large greenhouse gas contributors) as China and the USA do not want to commit themselves at all. This is not surprising as at this moment a reduction in greenhouse gas emissions is equivalent to a reduction in energy supply because fossil burning produces about 90% of all energy worldwide. We come to the unpleasant conclusion that our energy future is far from well prepared! Thus as long as we do not use other large scale, reliable, safe and environmental friendly methods for energy production, all agreements in the style of Kyoto are doomed to be failures. New and clean energy technologies are therefore a must for our future.

Unfortunately we do not have many choices. In fact there are only three major possibilities: fission, renewables and fusion. The drawbacks of the first are known (although one should not exaggerate and look at these in a realistic manner). The second possibility, an excellent one but, has unfortunately only a limited potential for a country such as the UK, without enormous investments in large amounts of windmills or solar installations. In addition, these will cause a large visual pollution - especially sad in a

nice countryside such as the one in the UK. The third option has a huge potential as a clean, inexhaustible and safe energy production method and therefore should devote all our attention as a future energy source.

The UK can contribute quite significantly to solve the complex and very important problem of our energy future by continuing to actively involving itself in the development of fusion energy. The UK has a very good record in this field with major labs as UKAEA Culham - which have played a pioneering role in developing fusion - and with hosting the most important fusion experiment in the world, the Joint European Torus or JET. Thanks to JET, enormous progress has been obtained in the last years, with as highlight the demonstration of multimegawatt power levels during several seconds from controlled fusion reactions. Keeping the knowledge and know-how actually present on fusion science in the UK scientific community seems therefore mandatory and renders an enormous service not only to the UK but also to the rest of the world.

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