

The role of the European scientific and engineering community in solving problems of global power engineering at the present stage

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Ladies and gentlemen,

Thank you for this invitation which allows me to present some thoughts of FEANI on the subject.

Allow me first to say a few words about FEANI.

FEANI is an association of professional engineers in Europe. It today links together national engineering organizations of 31 countries. We are very proud that for Russia, the Russian Union of Scientific Engineers (RUSEA) is amongst our members.

Through this network, FEANI defends the interest of around 4 million engineers.

Our main objective is

1. To assure the recognition of the professional qualification of European engineers, in Europe and worldwide
2. To contribute to the promotion of the mobility of engineers
3. To assure the quality of their education.

To do that, FEANI has developed a set of tools, as for instance standards and procedures for accreditation of engineering studies, or the engineering professional card now in implementation by some of our FEANI members. But I will not explain this here as this is outside the scope of my presentation.

Recently, FEANI has also produced a so-called 'position papers', as for instance the position paper on 'Energy'.

This paper is FEANI's answer to the latest 'European Energy Policy' for Europe, prepared by the European Union.

My presentation will be mainly based on this position paper.

What is at stake, in Europe?

There are 3 major issues.

1. Ensure a secure energy supply (for Europe) for the energy Europe is buying from outside
2. Ensure a sustainable production of energy with a significant reduction of greenhouse gas emission. The challenge being: energy efficiency; renewable energy
3. Improve and develop new energy technologies

What about the European Energy context?

Europe, perhaps more than other continents or regions in the world, will be facing tremendous challenges in the future. Indeed, the globally significant growing demand for energy will probably result in a shortage of energy resources – traditional – non-renewable – with an increasing price at the same time.

In addition, those energy resources are now concentrated in politically unstable regions and only a few European countries have still a noteworthy supply of those non-renewable energy, as coal, oil and gas.

Pollution problems related to energy usage have been addressed for quite some time through adequate technologies and emission control systems and must be further drastically improved. For instance, the CO₂ emission and global warming must be kept within the limits of the Kyoto Protocol (1997) and within the limit of other global agreements, still to come.

It is a fact that the European Union faces serious challenges concerning the security of the energy supply and import dependency on the one side and on the other side the competitiveness and efficient implementation of its internal market on a sustainable base and under control of greenhouse gas emission.

Having briefly presented the scene ... where do engineers intervene?

1. Concerning the first issue, namely ‘Ensure secure energy supply’, the role of the engineers is to give advice to politicians.
Indeed, it is the clear mission of the ‘politics’ to set up agreements and contracts with providers inside and outside of Europe for the supply.
The engineer must therefore develop competencies not only in the technical field but also to transmit clearly his advice in a language understandable by politicians.
2. Concerning the second issue, namely ‘Ensure sustainable production and significant reduction of greenhouse gas emission’, here also politicians, policy makers at European and national level, play an important role as they are responsible for setting the regulations, to be agreed upon at least at European level, such as for instance:

- reduction of CO2 emission, which affects the energy production in plants using either solid or liquid fuels
- reduction of CO2 in transport (cars, aviation, ..)
- usage of renewable energy sources versus non-renewable sources
- geological storage of CO2
- etc.

But on this issue, if politicians have the lead, the contribution of engineers is crucial.

Indeed, to develop energy systems, which are more efficient and less polluting, at a reasonable cost, it requires

- constant innovation, research and development in energy technologies which, in Europe, goes also with technology transfer between EU countries; and
- the protection of the environment through the complete spectrum of energy production and transmission

The design, the development and the implementation of a European Energy Policy requires therefore the total involvement of engineers.

Their participation in solving the problem related to this issue covers not only technological domains but also legal and economical aspects.

3. Concerning the third and last issue, namely ‘improve and develop new energy technologies’, this is clearly the privileged domain of engineers. Indeed, in the technological field, it is necessary to

- Develop/improve technologies that reduce emission and increase efficiency,
- Solve the issue of technology transition, knowing that technology change is generally slow, but this should not hinder the development and the diversification of primary energy sources in order to achieve a balanced energy supply and usage

E-mobility, smart grids, smart home as well as electric cars are also targets which are currently under intense discussion in the public.

→ The crucial role of engineers in those fields is evident.

We have seen that energy, in these three interrelated components: political, economical, and scientific, is a multidisciplinary field in which engineers from several different disciplines play a key role, however in cooperation with technicians and scientific experts from other areas such as chemists, geologists, economists, lawyers, etc.

Facing the challenge of energy in Europe, and recognising the important role of the engineers in the development and optimization of solutions for the short, medium and long term, engineers need to bring this to the attention of the European and national authorities responsible for the European and national energy policy as well as to the engineering institutions.

In case of Europe, we should point out that it is quite difficult to find a uniform response to energy issues and in particular inside FEANI with 31 countries including 27 EU countries.

On one end, there are a variety of different situations from the point of view of energy. On the other end, from the point of view of engineers, there are also many differences in relation with the number of engineers, their level of competence and degree of training. The personal position of an engineer on energy issues may very well depend on the position of his country which, for political and/or financial reasons might exclude or enforce one or the other type of energy without necessarily technical reasons.

There is however no doubt about the necessity for continuous professional development (CPD) for engineers. Many of the specific technical matters in different fields of energy require a high level of knowledge and experience, which must be permanently updated given the continuing and fast technological development in energy solutions and environmental issues.

In addition, a continuous update of knowledge in legislative and economic fields is also necessary.

Therefore, CPD must be promoted, even enforced, at European and at national level. Initiatives must be taken to encourage professional and educational institutions, as well as enterprises and public administration to provide more practical development for continuing education for engineers.

A major question remains!

Will there be sufficient engineers in Europe to cover the need related to the energy challenge?

The innovative strength, the size and the technological wealth of Europe depends, in great measure, on its engineers. But in many European countries there is a negative trend regarding engineers. Indeed, the young generation is, in many countries, less interested in engineering education and in the profession. This will lead, if the trend is not reversed, among other negative effects to the outsourcing of research and development services to overseas technology companies with the loss of technology leadership in Europe.

This would, in turn, have serious effects on the economy and the labor market. It is thus vital to reverse the trend and it is a priority “to promote the interest of young people in the engineering studies”. Politicians, professors and members of the education institutes, the media, the industry, are much requested to get strongly involved in it.

If this cannot be achieved, if there is no political and financing support for actions to reverse the trend – and this is at the present time the case, except for national measures taken by some EU Member States – the EU, which announced its intention to become a leader in green energy and committed in qualified objectives to be achieved in energy reduction, CO₂

reduction, % of renewable energy, etc., will have enormous difficulties to reach those objectives.

Moral and societal responsibility of the engineers

To finish, allow me to say a few words about the societal role and the ‘moral’ responsibility of engineers. This a heavier and heavier burden for engineers as the technological development becomes more and more risky as it tackles the limits of our knowledge and that failure may have dramatic consequences.

Indeed, engineering started in a time where cost factors, as well as environment factors did not play a significant role. This remained so for a long time even when engineering switched from military application to civil objectives.

In the meantime, cost has started to play a significant role. It plays now such an important role that we see that in all engineering fields cost savings go sometimes to the detriment of safety and environment. The recent example of the environmental catastrophe in the gulf of Mexico seems to be a striking example of it.

Furthermore, pushed by the technical and engineering challenge as well as by politicians, industries and market considerations, which objective is to concentrate power, some technologies have been developed and continue to be developed which dangerousness is proportional to the reported and non-reported incidents it has caused since decades as well as to their deviation towards other objectives it was not designated for. The enormous amount of money invested in the development of those technologies leads under financial, political and market considerations to propose those solutions in countries where the climate conditions for other renewable energy sources are available, which should be more suitable, for instance, from an environment point of view.

It will be up to each engineer to decide himself if he may morally support and participate to such development and implementation and if it corresponds to his code of ethic.

Thank you for your attention.