

**POSITION PAPER
THE ROLE OF
ENGINEERS IN THE
FUTURE OF ENERGY IN EUROPE**

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1. European energy context

Energy supplies in Europe will be facing tremendous challenges in the future. The globally significant and growing demand for energy will result in a shortage of energy resources with an attendant increase in prices. In addition to this, the majority of the energy resources are located in politically weak regions and only a few European countries have a significant supply of coal, oil and gas.

For a number of years pollution problems related to energy usage have been addressed through adequate technologies and emission control systems in order to keep CO₂ emissions and global warming within the limits of the Kyoto Protocol (1997), or according to future global agreements

The European Union (EU) faces serious energy challenges concerning security of supply, import dependence and the competitiveness and effective implementation of the internal energy market as well as sustainability and control of greenhouse gas emissions. So far, the European Commission (EC) initiatives have been based on "Action Plans" for 2007-2012 and the proposed new Action Plan 2010-2014 (postponed till 2011), and also in "energy or climatic change packages". However, the European Federation of National Engineering Associations (FEANI) considers it is absolutely necessary for the EU and the member states to ask the EC to look at the need for a medium-long term European Energy Policy.

FEANI notes that the "Communication from the Commission to the European Council and the European Parliament "An Energy Policy for Europe" [COM (2007) 1 final" introduces a complete set of measures (the 'energy' package). This European Energy Policy should lead a new industrial revolution and create a high efficiency energy economy with low CO₂ emissions.

FEANI is fully convinced that the European Energy Policy is the most effective response to these challenges, which are faced by all Member States. The Policy has set several important energy goals which are covered in detail in the Annex of this position paper): The goals are:

- Ensure a secure energy supply
- Sustainability: reduce greenhouse gas emissions:
 - o Energy efficiency
 - o Renewable energy
- Develop energy technologies
- Consider the future of nuclear energy

2. Legal, economic and technological aspects and the role of the engineers

To achieve energy systems which are more efficient and less polluting at a reasonable cost the implementation of the European Energy Policy requires:

- Constant innovation and research & development in energy technologies, accompanied by a technology transfer between European countries
- Protection of the environment for all facets of energy production and supply

The design, development and implementation of a European Energy Policy requires the involvement of engineers. Their participation could involve three different perspectives: legal, economic and technological.

- At the legislative level, it is necessary to encourage measures to increase energy efficiency and reduce the level of energy dependence.



Engineers have an important role in advising legislators on such measures. In turn legal aspects are crucial in the field of energy, so it is necessary to ensure that there are sufficient engineers with the necessary knowledge of legislation to enable them to take appropriate technical decisions and manage projects and implementation solutions in the most effective way.

- In economic terms, it is evident that engineers need a good level of knowledge of economic topics to enable them to participate fully in a field as sensitive as “energy”, both in the search for and optimization of technical solutions as well as in the development and implementation of the different types of projects running in the whole of Europe

- In the technological field, it is necessary to develop technologies that reduce emissions and increase efficiency and improve technology transition. Since major technological change is generally slow this immediate action should not hinder the development and diversification of primary energy sources but will help achieve a balanced energy basket. E-Mobility, Smart Grids, Smart Home and Electrical Cars for example are topics which are currently under intense discussion.. The crucial role of engineers in this wide field is self-evident.

These three interrelated components: legislative/political, economic and technological illustrate that energy is a multidisciplinary field, in which engineers of many different specialties play a key role, with the aid of technicians and experts from other areas of knowledge such as chemists, geologists, economists, lawyers, etc.

Facing the challenges of energy in Europe and recognizing the important role of engineers in the development and optimization of solutions for the short, medium and long term, engineers need to bring the attention of professional engineers’ institutions and the responsible authorities the key issues relating to the role of engineers in the context of a European Energy Policy

Although it is difficult to find a uniform response to energy issues in a European context, FEANI is uniquely placed to provide a view. FEANI has 30 countries in membership, including the 27 EU countries which means , there is experience of a variety of different energy situations , and also that it has the views of engineers from a variety of academic and professional development backgrounds and from a range of industry and public service environments.

As the key multicultural and multidisciplinary organization for engineers, representing the voice of nearly four million European engineers, FEANI supports the initiatives of the EU (Commission, Parliament and Council). Furthermore its many years experience allows it to make informed and detailed comments regarding the issues raised

3. Are there sufficient professional engineers with the expertise to meet the demands of society in the field of energy?

European engineers certainly have the high level of knowledge and experience necessary to tackle all challenges that may arise in the medium to long term on the numerous and different aspects concerning the sustainable energy system.

However, there is no doubt that this needs to be supported by continuous professional development (CPD), since many of the specific technical matters in the different fields of



energy require continuous updating of high level knowledge given the continuing technological development of energy and environmental issues. In addition to technical expertise, a greater and continuously updated knowledge of the legislative and economic issues is necessary.

The FEANI Continuing Professional Development Committee (CPDC) is promoting, at European level as well as in all member countries, initiatives to encourage professional and educational institutions, as well as enterprises and public administrations, to provide the necessary continuing education for engineers.

4. Will future needs be covered by a sufficient number of engineers?

The innovative strength, and the size and the technological wealth of Europe, depends, in great measure, on its engineers but in many European countries there is a trend towards an increasing shortage of engineers. This would lead to, among other negative effects, the outsourcing of research and development services to overseas technology companies with the consequent loss of technology leadership. This would, in turn, have serious effects on the economy and the labor market. The problem with the "shortage of engineers" is well known to the EU institutions

FEANI and its national members consider it a priority "to promote the interest of young people in the engineering studies". It generally supports the actions of the EC in this area and is working actively to help solve this specific problem

The problem related to Science, Engineering, Technology (SET) education in Europe, and the lack of SET for the labour market has been developed by the EC, reaching the following recommendations for action with FEANI participation in most of them.

- Create a coordinated body to support business/education with the aim of ensuring more focussed studies better reflecting societal needs. FEANI has participated in the University Business Forum which has arisen from this intent.
- Continue to promote SET and engage with European and National Stakeholders

Better target SET to attract more young people (using media for instance). This has been addressed by the FEANI/VDI project "More Engineers for Europe". There is scope for building on this initiative to make it a European wide campaign – especially if there was support from the Commission

The timing is right to involve the EP in the EU intention (as follow-up to the Kyoto Protocol), to make Europe a leader in green energy and to make commitments on qualified objectives for Europe. The conjunction of these two goals, both related to energy, are only achievable if enough well-educated engineers from all categories and fields are available.

5. Is Academic training in technical colleges and universities appropriate to prepare professional engineers with the level of knowledge required to facilitate the meeting of current and future energy needs?

The continuous work on R&D in technical schools and universities, together with the implementation of the Bologna Declaration, means that, the existing specialties and qualifications should offer a good guarantee that the academic formation of future European engineers will be sufficient

However, it is absolutely necessary that professional engineers participate actively in the academic training of new engineers so as to ensure that the latest knowledge and developments from a practical industrial and scientific perspective are included. With regard to



this we highlight two lines of the work of FEANI for stimulating a relevant education of engineers:

a) The accreditation of academic engineering programs through the methodology developed by the EU funded EUR-ACE Project and implemented by the European Network for Accreditation of Engineering Education (ENAAE) in which FEANI is an integral part. The accreditation of the programs of schools and universities for the academic formation of engineers is done through Agencies duly accredited by ENAAE

b) To improve the level of academic training in universities and technical schools in Europe, a very relevant initiative of the EC is the conducting of a feasibility study regarding the design and testing of a new, multidimensional global university ranking system.. The study is being performed by the CHERPA-Network Consortium, in which FEANI plays an important role. This Consortium is formed by various specialized institutions and universities of different EU countries. While drawing on the experience of existing university rankings and of EU-funded projects on transparency in higher education, the new ranking system is aimed to be:

- Multi-dimensional: covering the various missions of institutions, such as education, research, innovation, internationalisation, community outreach and employability;
- Independent: it should not be run by public authorities or universities;
- Transparent: it should provide users with a clear understanding of all the factors used to measure performance and offer them the possibility to consult the ranking according to their needs;
- Global: covering institutions inside and outside Europe

6. Conclusions

In FEANI's view the establishment of a European Energy Policy must be a priority for EU policy makers. It must take into account that Energy Technologies offer a wide range of alternatives for solving the energy problem in a sustainable, medium and long term way. However, since none of them is capable, by itself, of giving an entirely satisfactory outcome the solution is to apply a combination of them all. Moreover, energy policy makers must be mindful of the need to update policy over time in order to adapt to changing technology.

Each country must choose an energy basket guided by ethical and political criteria:

- it should not slow economic development.
- It should not cause environmental damage

Today there are enough energy technologies (supply and use sides) to help achieve these goals. National decision makers have the responsibility to choose without bias the combination of technologies appropriate to their nation.

In any case, it is necessary to remember that in the EU, in accord with the need to reduce GHG 20 % in 2020, it has been decided to establish mandatory national targets consistent with:

- a 20 % share of energy from renewable sources by 2020
- a 10 % share of energy from renewable sources in transport in Community energy consumption by 2020
- a 20 % improvement in energy efficiency by 2020.

What role should nearly four million European engineers, represented by FEANI, play in the future of energy, in Europe?



- *FEANI is able to provide the necessary support to the technical solutions considered most appropriate by the EU..*
- *FEANI is a relevant stakeholder, highly experienced in collaborating with the EC and the European institutions, especially in the planning and drafting of directives and other regulations on energy.*
- *FEANI is an important support for the policy makers, in the design, implementation and application of a European Energy Policy*

European engineers and their professional institutions will be an excellent support to the EC in the fields of innovation, research and development of new technologies, applications and uses of energy.

Decision makers must be aware that engineers have a role in all three main areas within the energy field:

Engineering: studies, profession, expertise

Policy: priorities, budgets

Society: acceptance (in general terms), users (specific), education and media

Finally, FEANI actively works to support the EC strategy in energy by:

- increasing the number of professional engineers with the expertise needed to sufficiently meet the demands of society in the field of energy,
- facilitating continuous professional development (CPD);
- promoting the interest of young people in engineering studies
- ensuring excellent academic training, which is well adapted to energy matters, in technical schools and universities, which will provide professional engineers with the level of knowledge appropriate for current and future needs

Summarizing: The four million European engineers, integrated into FEANI through their national professional institutions, form a body of knowledge and experience in all technical fields. For this reason it is important that the European Commission and other European Institutions seek the views and contributions of FEANI in all cases (Draft Directives, Regulations, etc.), in which European engineers can provide the expertise and knowledge which will facilitate the work of decision makers and so better adapt European legislation to the needs of society.

