

**The AllChemE Seminars  
Where science meets society**

**The socio-economic importance of chemistry in Europe**

**Dr. Simon Campbell, President-elect of the Royal Society of Chemistry (RSC), London.**

**Highlights**

- Chemistry is critical to the economic well-being of the EU both in terms of economic and social activity. Europe is currently the leading global producer and consumer of chemicals.
- The European pharmaceutical industry is spending increasing amounts of its R&D budget outside the EU due to the relative business environment and improved competitiveness.
- REACH has some benefits but needs to focus on risk and not add to the burdens of industry. There will be a large increase in animal testing for toxicity and resources will be diverted from other research activities.
- EU needs to improve R&D and innovation support to ensure Europe remains competitive. The challenge of increasing R&D investment to 3% of GDP is daunting and requires large increases in business investment together with more science graduates.
- MEPs would like to see coherent, alternative proposals to REACH and alternative impact assessment data. The question of a legal challenge to the REACH impact assessment was raised.

**Summary**

Prof. Dr. Wolfram Koch, executive director of the German Chemical Society welcomed delegates to the sixth AllChemE Seminar at the European Parliament. Colin Humphris, Research & Science director at Cefic introduced AllChemE and Oraldo De Toni political secretary of the European Mine, Chemical and Energy Workers Federation (co-sponsors of the event) outlined the role of his organization. Our host MEP Mr. David Bowe expressed his pleasure in being involved with the event. It was a good opportunity to talk about chemistry – REACH would be discussed in the European Parliament (EP) soon. A draft report was ready and it was probable that the Environment Committee of the EP would lead the debate and discussion, but it was possible that a second committee would also be involved due to the volume of work. The draft document was the largest document that the EP had had to deal with and 100's of amendments were anticipated. Although the debate would start soon, it would not reach resolution until after the EP election in the summer. There would be many new MEPs after June due to enlargement as well as the normal political process. There were many opportunities to influence the outcome of this legislation that could have profound impacts on socio-economic activity in the EU.

**Chemistry critical**

Dr. Campbell started by emphasizing how critical chemistry is to the EU – it underpins a large part of the EU's economic activity industry and contributes to every aspect of our lives: our health, wealth and environment. But chemistry faces economic, social and legal challenges. How can stakeholders in society and chemistry work together to ensure future success? The EU is the world leader in production and consumption of chemicals. It accounted for over 27% of world chemical sales in 2002 worth 528 billion euros. Chemistry contributes around 2.4% of total EU-15 GDP and has a positive trade balance with the rest of the world. Labour productivity is growing although the workforce has declined some 15-20% in the last 10 years. This increased production has been achieved without increased energy consumption and with reduced total CO<sub>2</sub> emissions compared to 1990. The industry is a responsible industry.

But what of the future? As leader of the team that brought us Viagra whilst at Pfizer, Dr. Campbell's organic synthesis expertise has been applied mainly to pharmaceuticals. The business environment for pharmaceuticals has lessons for chemistry. The EU is the leading player in R&D intensive pharmaceutical products enjoying significant growth and a large positive trade balance compared to other high-tech sectors. But the environment for pharmaceuticals in the EU compared to the US complicates and inhibits growth and innovation. Individual European nations control price and prices are constrained at the start of a product's life – unlike the US. The recent problems that have stopped the establishment of a primate laboratory in Cambridge typify the issues faced by medical research in the EU – governments need to do more to protect researchers. 70% of new medicines launched from 1998 – 2002 were in the US and R&D spending in the States now outstrips the EU. In fact EU-based pharmaceutical companies are spending a growing proportion of their R&D money in the US, around 41% of their RTD effort (some US\$5 billion per annum) is spent outside the EU. Not surprisingly the number of new chemical or biology based products discovered in the EU is declining whilst in the US this is growing and is now higher than the EU – a dramatic shift over the last decade or so. The pharmaceutical industry sees its economic future in the US due to free competition in the market and it is only a matter of time before the bulk of investment is made there.

## REACH

Will chemistry go this way too? The REACH proposals are the most significant development for controlling chemicals in the EU for decades. They will place a burden of proof on industry to show that a chemical is safe for use. REACH has some positive aspects including increasing confidence in risks posed by chemicals in use, reduced bureaucracy and simplified registration for low volume chemicals. It will be compatible with international control initiatives, does not discriminate between 'new' and existing chemicals and in theory will encourage testing via *in vitro* and other non-animal studies. However testing costs will be high and could lead to withdrawal of useful, but low value, chemicals and will increase loss of competitiveness through industry relocation – a threat that already exists without REACH. Despite the suggestion that non-animal testing will be possible, animal testing will be significantly increased as it is the only current method to determine toxicity of a substance. In addition large amounts of testing may be misdirected from low-volume, high concern substances. The control is based on hazard rather than risk – risk is more important.

The Royal Society of Chemistry (RSC) believes that REACH should not lead to a withdrawal of useful chemicals, needs to strike a balance between transparency and commercial confidence and should not inhibit innovation – substitution does not in itself lead to innovation. Risk should be the main criteria for evaluation and REACH needs to be compatible with other international measures, address issues of increased resources and expertise needed to implement the measures (and diverted from wealth creating R&D) and ask only for data that has real value. Dr. Campbell highlighted the views of the EU Competitiveness Council on REACH. The original proposal was expensive with little of the downstream benefits expected from such a profound proposal. The proposal has been improved but still there is much to do. The chemical industry should not be seen as the enemy – it is an innovative industry that has contributed much and should not be hindered by excessive bureaucracy.

What is the likely impact on research? R&D and capital spending in the European chemical industry has been, and currently is, low compared to that in the US & Japan. Trends in trade balances with other global regions show a move to negative balances with the Asia Pacific region. This region (not including Japan) is set to grow to be the largest world chemicals market by 2015 experiencing growth of almost 5% per annum compared to less than 2% in Western Europe. Research follows capital and pharmaceutical companies are establishing new RTD facilities in Asia Pacific.

## European action

Where does this leave Europe? Europe needs to support research and innovation if it wants to achieve its social and economic objectives. The Barcelona 'call for action' to grow average R&D investment to 3% of GDP from the current average of 1.9% is a vital but daunting target. The US and Japan are already close to this target. To achieve the target in Europe by 2010 requires an annual growth of 6% in public investment and 9% in private investment but does the business environment support this investment? If the 3% Action Plan is successful it will require over 1 million extra research personnel but could generate an annual increase of 0.5% in GDP. The gap in R&D investment between EU and US/Japan is largely (80%) due to differences in domestic business spend – 56% of EU R&D is financed by business compared to 66% in the US and 73% in Japan. Annual growth in R&D spend is 5 times higher in the US than in the EU. The EU produces proportionately more students than the US or Japan, but manages to employ a proportionately lower number in the total workforce. Some 400,000 EU born researchers work in the US with few planning to return 'home'. Combined with a downturn in numbers of young people entering there is the prospect of a shortage of high quality researchers over the next 10-15 years. Competitiveness in Europe is deteriorating. The growth rate in overall investment and performance is low and there seems to be an inability to attract knowledge intensive and knowledge producing capital.

In conclusion, Dr. Campbell called for supporting actions for innovation in Europe; if most innovative activity is pursued outside Europe, then we will lose on all fronts. Initiatives such as the 3% Action Plan, the establishment of ERA and initiatives to encourage more science students are challenging but vital. Initiatives need to remove barriers to innovation and promote a positive business environment. Chemistry is a vital part of an innovative and successful European future.

## Debate – send us a new REACH

A vigorous Q&A session followed with contributions from a number of MEPs across the political spectrum. **Giles Chichester MEP (PPE)** asked if Dr. Campbell could make his presentation to EC Environment Commissioner Wallstrom and raised the issue of bursaries for students of chemistry. **Sir Robert Atkins MEP (PPE)** asked how science can be communicated to students and the public to help them better understand the benefits and prospects in science. **Malcolm Harbour MEP (PPE)** is vice chair of the Science and Technology Options Assessment Panel and raised the issue of the credibility of science and scientists and the need for more events such as the AllChemE seminars where scientists address politicians. **David Bowe MEP (PSE)** asked about the ability of software tools to 'pre-sift' chemicals for risk. Dr. Campbell agreed that prioritization was important. **Imelda Read MEP (PSE)** talked about the public's perception of science and a lack of 'faith'. She said that looking at FP6 and forward to FP7 Busquin's 'call to action' was more like a 'cry for help'. In particular she thought Member States needed to improve funding and coordination in research. Ms Read also made some points about profitable pharmaceutical trading practices in Europe. **Caroline Jackson, MEP (PPE)** is chair of the Environment Committee and suggested that what she needed was for the chemists to provide an alternative proposal for REACH and an alternative impact assessment. Her message was "stop whinging and give us a complete coherent proposal". This is what the NGOs would have done. Colin Humphris of Cefic acknowledged the request and talked about work on tiered risk assessment and extended risk assessment. **Caroline Jackson** asked if industry had considered challenging the impact assessment in court. **David Bowe** concluded by thanking all involved and summed up by saying that chemistry had to be proactive, communicating clearly and directly with the European Institutions, and providing coherent alternatives to REACH. Innovation and increased R&D were important to Europe. The debate was just beginning and there was a tremendous chance to influence MEPs before decisions were made.