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European Chemical Cluster for the Support of SME www.chemsme.net

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European Chemical Cluster for the Support of SME www.chemsme.net

Strengthening the support structure for innovation: research vouchers

An important element of long-term economic development policies is improving the innovative capabilities of SME's, as innovative SME's are an essential part of the fabric of regional clusters to enable them to compete on an international scale. SME's however do have a tendency to "go it on their own". They often have an eye for the opportunities the market offers, but then realise that despite an intensive engineering effort, they can't launch the new product because of some apparently major insoluble problem. However, they are not aware that solving this problem might require just a minor effort by external parties like public institutions elsewhere in Europe, as they have the required technological knowledge readily available. The underlying causes for this counter-productive behaviour of SME's are two fold:

- the fear that innovative ideas might be disclosed to the public domain and that the competition will reap the benefits
- unfamiliarity with the specific strengths of each of the regional scientific or research institutions

In the Dutch province of Limburg it was found that by using Research Vouchers, SME's are more likely to cooperate with external R&D institutions. How does this work? A "research voucher*" entitles an SME to a limited amount of R&D services from an external institution, for free. Of course, the barriers described above can't be overcome with a voucher alone: it is the way that they are distributed which makes them effective: when a member of LIOF's staff visits an SME and encounters a concrete technological problem, he can discuss the possibility of involving an external R&D institute. During this discussion the entrepreneur can't use the argument that such involvement is too expensive, because with the availability of a voucher, costs are no longer an issue. As a result, the real pros and cons are discussed and generally, the entrepreneur agrees with bringing in external know-how. The LIOF officer then matches the problem at hand with the capabilities of the participating R&D institutions, after which the project is carried out, usually with the desired result. When used in this way, the voucher is a demand driven innovation instrument, which makes SME's susceptible to the involvement of external sources of technology and know-how.

** also referred to as "innovation voucher" or "technology voucher"*

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Essential elements of a voucher initiative

The voucher instrument is a powerful addition to other innovation oriented measures, as it can effectively reduce the barrier to "scientists in an ivory tower". However, this is only true when the voucher distribution is organised in a demand oriented way. Demand orientation can be illustrated by the following sequence of events:

- An SME has a product (innovation) related problem to be solved
- The entrepreneur receives a voucher
- An R&D institution is identified with capabilities / know-how specifically related to the problem at hand
- The institution executes a project to solve the problem
- A money transfer is made to the institution in exchange for the voucher

In this sequence, there are two elements which are essential for the success in the long term of a voucher scheme:

- Assessing which actor will assist the SME to identify and articulate the problem to be addressed with the voucher, and more importantly to identify an R&D institution with suitable know-how;
- The participating R&D institutions should be prepared to execute so-called "mini-projects"; in order for the SME to obtain tangible results, a project should have a clear goal at the start and an equally clear result at the end

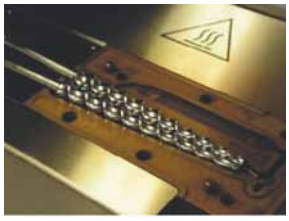
Incorporation of the first element is fairly straightforward, as in most regions intermediary organisations which have the stimulation of innovation at SME's as their prime task already exist.

Financing a voucher scheme

Although an SME receives free technological assistance in exchange for a voucher, a voucher scheme is not expensive: most governments already stimulate the transfer of technology from R&D institutions to SME's and installing a voucher scheme requires only a slight redistribution of funds. In the Netherlands, the government plans to issue 3000 vouchers annually.

Vouchers in action: an example

Anatech is an SME in Limburg, which develops and produces analytical instruments for chemical and physics laboratories. 'One of our products is a small extruder, an instrument able to mix very small amounts of polymers with additives, influencing the property profile of the plastic. In particular where very small amounts are necessary, i.e. where only little material is available or it is extremely expensive, this is an important technique', says Anatech's president Archi Leenaers. 'Using the extruder in combination with very tough (e.g. glass fibre filled) compounds however, sometimes caused scratches in the barrel.' Anatech subcontracts the manufacturing of the barrel to a supplier, and it appeared that some of the barrels were less tempered than others. 'We needed more knowledge on the tempering process in order to improve communication with our suppliers', Leenaers explains.



Through LIOF, he came into contact with WTCM (Diepenbeek, Belgium, www.wtcm.be). 'We analyzed Anatech's tempering problem in practice', Marc van Stappen of this institute explains. 'Our investigation revealed that the tempering process was performed under far from optimal conditions. The tempering process occurred in a large oven, together with other pieces with different tempering requirements. If these requirements diverged too much, the barrels were tempered poorly'. The final result is that the tempering process is now simplified in such a way that the exact placement of the barrels in the oven is far less important.

(source: Link Special South Netherlands, April 2005)

North-East of England; The North-East Regional Innovation Strategy for the Chemistry Using Industries

The Chemistry Using Industries (CUIs) are a vital component of the regional economy representing some 25% of regional GDP; directly employing 34,000 people and indirectly a further 200,000. The industries are the focus of the Process Pillar of the region's Strategy for Success and are represented and supported by NEPIC the process industry cluster for the region.

Innovation is a key success factor for the CUIs in the region and NEPIC has set up an industrially-led Innovation Group to further develop its contribution in the region. An early output from the Group is an innovation strategy in which the industrial and academic capabilities of the region have been assessed and mapped against nationally agreed Research and Technology priorities to identify critical strengths for development and major gaps which could be inhibiting progress. This work was supported by the Centre for Process Innovation recognising this organisation's position in the delivery of the strategy.

Areas of both industry and academic strength have been identified in Responsive Manufacturing, Imaging and Displays, Bioprocessing, Fuel Cells and in the key underpinning area of Measurement Science. These are closely followed by Catalysis and Creative Synthesis which with continued focus could also become technology strongpoints for the region.

For some technology platforms industry strengths are not fully supported in academia. There is a need to review gaps in the areas of Sustainable Chemistry (outside Fuel Cells), some aspects of Materials Science and the related areas of Interfacial Technology (particularly small scale ('nano') effects) and Product Design and Formulation. It may be that key regional industry strengths could best be supported by universities and institutes outside the region. It will be important to establish the optimum network of support for discovery and development and to identify the importance of geographical proximity in the delivery or that support. Conversely, industrial exploitation of Micropatterning, Bioimaging and Chemical Computation do not match the region's academic strengths.

Critical mass is also a key component for success in maintaining and developing the innovation performance of the region. Attention here should focus not only on the attraction and retention of industrial R&D Centres to the Region or on recruiting 'star' academics and their teams but also on the development of supply chain clusters of suppliers, manufacturers and end-users in emerging technology driven sectors.

More information about the North East Process Industry Cluster can be found at: www.nepic.co.uk

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The Innovation Group strongly believes that these priorities should direct and guide funding for technology and innovation and that developments in the region should complement the national technology priorities being developed through the national Chemistry Innovation Network and the national Technology Strategy Board.

The possession of critical technology and underpinning science strengths in the region is a major pre-requisite for strong innovation performance but without appropriate access to vital enabling technologies such as measurement, science success, particularly for SMEs, will be limited. Further initiatives to improve access and effective technology transfer are required.

This innovation strategy is therefore focused on the key priorities of:

- Building on existing science and technology strengths and on identifying and closing critical gaps
- Improving access and knowledge transfer to more effectively exploit these strengths
- Maintaining and improving the critical mass of innovation capability in the Region to drive performance

To deliver this strategy will require coherent and committed action from all key stakeholders - industry, academia and government agencies on a scale not yet achieved to date.

Saxony-Anhalt; Fraunhofer Pilot Plant Centre for Polymer Synthesis and Processing

The Fraunhofer-Gesellschaft is the leading research organisation for applied research in Europe. By combining the synthesis and processing competence of both Fraunhofer institutes involved in the pilot plant centre, it is possible to reach tailor-made solutions from raw materials for synthesis to high-performance components. This 'horizontal development line' represents a new quality of R&D potential, as normally there is a clear separation of polymer production from polymer processing, which hinders the flow of information about problems with application and attempts to solve them. One of the main concerns at the pilot plant centre is the optimisation of precisely this interface by carrying out joint development work between the synthesis and processing groups. About 330 main arrays with approx. 840 field instruments enable all of the usual polymer synthesis processes to be carried out in the synthesis section, with the exception of ultra-high pressure polymerisation. Pressures of up to 100 bars, temperatures over a range from -25 to 350°C and working volumes of up to 650 litres can be achieved. In view of the technical and research character, great emphasis is placed on the automation and monitoring of processes.

Synthesis

The working group in the synthesis section possesses many years of experience in the field of dispersion/emulsion polymerisation. It has carried out intensive studies of water-soluble and water-dilutable polymer systems, which have applications in areas such as environmental technology.

Other research work at the PAZ focuses on anionic solution polymerisation and bulk polymerisation/reactive extrusion. Beside rubber solution and polyamide /polyester, reactive (in-situ) compounding is at the centre of scientific interest.

A C4-grade professorial chair has been set up at the Martin Luther University of Halle, so as to allocate a higher level of technical and personnel resources to the research area of insertion polymerisation (inc. metallocene). The simulation/modelling of polymerisation processes carried out under its auspices is intended to achieve an optimisation of reactions by, among other things, alteration of reactor geometry and the corresponding periphery.

- Development/Adaption of polymeric systems in laboratory scale
- Assignation of thermodynamic and kinetic parameters of polymeric syntheses
- Procedural transfer of the laboratory syntheses into the pilot plants (up to 500l reactor volumes)
- Polymere's Physical-chemical characterisation
- Assignment synthesis: fabrication of small batches and test batches
- Optimisation of reaction management to the point of reactorgeometry
- Assignation the polymer's rheological properties, polymerblends and reinforced polymer systems with the help of filler material

More information on the Pilot Plant Centre for Polymer Synthesis and Polymer Processing can be found at:
www.iap.fraunhofer.de
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Processing

The work of the processing section is concentrated on long-fibre reinforced composites with a thermoplastic matrix. Its equipment makes it possible to process these materials in a variety of ways, from extrusion and injection moulding, to compounding and injection moulding as a closed process in a single machine (IMC). Glass and a wide variety of natural fibre types are being investigated for use as fibrous materials. This work also covers the complex of additive incorporation (adhesion promoters, lubricants, paint batches, stabilisers, flame retardants, nano-based materials). The investigations focus on the systematic evaluation of the influence of materials systems and technological conditions on a component's characteristic values. Thus the experimental and numerical description of a material's behaviour provides information about both the behaviour in use and the reliability of plastic components.

- Production of fibre-reinforced thermoplastic components
- Direct mixing and compounding of polymers and the necessary additives
- Use of various kinds and types of fibre (glass fibres, naturally-occurring fibres, polymer fibres, regenerated cellulose fibres etc.)
- Fibre content, length and distribution are adjustable
- Production of long-fibre reinforced thermoplastic components on the basis of polypropylene and long glass fibres with direct incorporation of the fibres: direct feed of glass fibre rovings into the polymer melts and subsequent formation of components by injection moulding
- Evaluation of the influence of the material system and the technological conditions on a component's characteristic values
- Investigation of the influence of sprue and injection moulding processes on the fibre lengths that can be achieved
- Technology, material and component evaluation on the basis of experiments
- Continuous numerical simulation
- Evaluation of fibre materials, matrix polymers and additives
- Compounding
- Injection moulding processing
- Compounding and injection moulding as a closed process
- Feedback of the components properties regarding the basis polymer's demands
- Discussion of potential alternative plastics

North-East of England; NEPIC Launch Events - what a party!

The London launch took place at the City Inn Westminster on 17th November with over 100 guests. The Secretary of State for Trade and Industry Alan Johnson MP (pictured left) welcomed the formation of NEPIC to represent regional interests of chemical, pharmaceutical and biotech business employing over 200,000 people in the North East. He said: "The sector plays a vital role in our economy, particularly in the North East where it contributes 25% of regional gross domestic product. The challenges and opportunities of today's globalised business community are great but by working together we can strengthen the industry, economy and society."

Government chief whip and North West Durham MP Hilary Armstrong said: "Industry and government must work together if we are to achieve our goal of high value, high wage and high skill economy. NEPIC plays a vital role in this and provides the strong, uniform voice necessary to harness the capabilities of our region."

MP Ashok Kumar announced in parliament on 14th November, "This House welcomes the launch of the North East Process Industry Cluster (NEPIC) on the 17th November which brings together the P&S Cluster and the Teesside Chemical Initiative; acknowledges the commitment and hard work of the chairmen Bob Coxon and Chief Executive Officer Dr. Stan Higgins and their colleagues in closing the gross domestic product gap of the North East region with other regions across the United Kingdom; notes that NEPIC already has over 200 members and represents 25 percent of the North East's economy in the chemical, speciality, pharmaceutical and biotechnology industries; and further notes that the employment of 34,000 people directly and 270,000 indirectly by NEPIC is vital for the North East economy."

NEPIC CEO Dr. Stan Higgins, Lord Derek, Foster, Ashok Kumar MP and NEPIC Cahirman Bob Coxon

On 23rd November Hardwick Hall was the focus of the North East launch event (below) and this attracted over 160 guests. Bob Coxon, Chairman of NEPIC together with member of the Leadership Team and NEPIC Executive gave a series of presentations which demonstrated that NEPIC was already having a significant impact on supporting the industry sector in the North East, despite its relatively short existence since April 2005.

News

28.-30. September 2005, ChemSME Workshop: „Forschung und Entwicklung auf Chemieparks"
Der Europäische Chemieworkshop im Rahmen des ChemSME Projektes brachte vom 28. bis 30. September 18 Experten der chemischen Industrie, Dienstleistungsunternehmen und lokalen Verwaltungen aus den Regionen Sachsen-Anhalt, Limburg und Nordostengland zusammen.

Im Focus des Workshops stand die Entwicklung von großen Chemieparks in den drei Regionen, wie z.B. Wilton International Site in der Nähe von Redcar, Leuna in Sachsen-Anhalt und Chemelot in Limburg. In diesem Zusammenhang wurden Themen von allgemeinem Interesse wie die Entwicklung von Energiekosten, Sicherheit, Umweltschutz und die Beziehungen zu umliegenden Gemeinden diskutiert.

Am Ende des Workshops nahmen die Teilnehmer an einer NEPIC Netzwerkveranstaltung mit über 150 Unternehmen aus dem Chemie-, Biotechnologie- und Dienstleistungssektor teil. Durch eine Präsentation der ASPIRE Kampagne sollten Unternehmen ermutigt werden, sich mit jungen Menschen in Nordostengland zu engagieren, um Beschäftigungsmöglichkeiten zu erhöhen.

14. Dezember 2005, ChemSME Workshop: "Nutzungsmöglichkeiten des Fraunhofer Pilotanlagenzentrums für Polymersynthese und -verarbeitung Schkopau (mitz II) durch kleine und mittlere Unternehmen"
Das Pilotanlagenzentrum für Polymersynthese und -verarbeitung (mitz II) stand im Mittelpunkt des internationalen Workshops des Interreg III Projektes ChemSME. Über 30 internationale Experten aus Wissenschaft und Wirtschaft kamen zusammen, um über alternative Finanzierungsmöglichkeiten für kleine und mittelständische Unternehmen zur Nutzung von hochwertiger Forschungsinfrastruktur zu diskutieren.

Den Teilnehmern wurden Best-Practice-Lösungen aus den Regionen Limburg (Niederlande) und Lombardei (Italien) vorgestellt, um kleinen und mittelständischen Unternehmen Finanzierungsanreize mittels eines Wertgutscheines (Voucher) zu geben, damit diese hochwertige, teilweise sehr teure Forschungs- und Entwicklungsinfrastruktur nutzen können.

Die Teilnehmer des Workshops beurteilten das Voucher-System durchweg positiv: „Das Voucher-System ist ein interessanter Ansatz zur Forschungsförderung, der sich in anderen europäischen Regionen als erfolgreich erwiesen hat. In Sachsen-Anhalt besteht ein konkreter Bedarf", so Dr. Gunthard Bratzke, Geschäftsführer des isw Instituts. Dem stimmte Herr Dr. Ulrich Buller, Leiter des Fraunhofer Instituts für Angewandte Polymerforschung, zu: "Das Voucher-System kommt zur richtigen Zeit…wir benötigen ein nachfrageorientiertes Forschungsprogramm."

Das ChemSME Projekt möchte insbesondere kleinen und mittelständischen Unternehmen den Zugang zum Pilotanlagenzentrum

Landrat Dr. Tilo Heuer signing the Joint Statement; in the background from left: Dr. Ulrich Buller, Dr. Gunthard Bratzke, Dr. Christoph Mühlhaus

Landrat Dr. Tilo Heuer bei der Unterzeichnung der gemeinsamen Erklärung; hinten v.l.r.n. Dr. Ulrich Buller, Dr. Gunthard Bratzke, Dr. Christoph Mühlhaus

ermöglichen, das auf dem Gebiet der Polymerforschung und -verarbeitung einzigartig in Europa ist. Während des Workshops bekamen die Vertreter aus Wissenschaft und Wirtschaft einen Einblick in das Innere der Forschungsanlage des Pilotanlagenzentrums.

Im Anschluss an die Veranstaltung wurde eine gemeinsame Erklärung unterzeichnet, mit der Forderung die Erfahrungen aus Limburg weiterzuentwickeln und eine mögliche Übernahme durch das Land Sachsen-Anhalt zu prüfen.

Gemeinsame Erklärung

Übernahme von Erfahrungen bei der Nutzung von Voucher - Systemen zur Nutzung hochwertiger Forschungsinfrastruktur

Schkopau, im Dezember 2005

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News

28 -30 September 2005, ChemSME Workshop: "Research and Development on Chemical Sites"
From 28th to 30th September the European Chemical Workshop within the project ChemSME brought together 18 specialists from the chemical industry, support agencies and local Government from the regions Saxony-Anhalt (Germany), Limburg (Netherlands) and North-East of England (Great Britain).

The Workshop looked at the way in which large chemical sites have developed in the three regions, focussing on the Wilton International Site near Redcar, Leuna in Germany and Limburg in Holland. There were themes of common interest discussed including energy costs, safety, security, environmental protection and linkage to the local community.

The Workshop finished with delegates joining a NEPIC network event involving over 150 chemical, pharmaceutical, biotechnology and support companies and linked to a presentation given by the ASPIRE campaign encouraging companies to support the drive to engage with young people across the North East to increase job opportunities.

14 December 2005, ChemSME Workshop: "Options for SME to use the Fraunhofer Pilot Plant Centre for polymer synthesis and polymer processing Schkopau (mitz II)"
The international workshop of the Interreg IIIC project ChemSME was mainly focused on the Pilot Plant Center for polymer synthesis and processing (mitz II). The project is aiming at developing and strengthening chemical clusters, especially concerning challenges und problems of SME in the chemical industry. Examples for these specific challenges are the lack of research and development capacities, the low innovation potentials, and problems with internationalisation.

During the workshop, more than 30 international scientific and economic experts were discussing alternative financing options for SMEs to use high-quality research infrastructure. The attendees learnt about best-practice solutions from the regions Limburg (the Netherlands) and Lombardy. In these regions, SME were offered a financing incentive by vouchers for the usage of high-quality and expansive R&D infrastructure. The ChemSME project gives SMEs the possibilities to access the Pilot Plant Center, which is unique in the field of polymer research and processing across Europe.

The participants of the workshop were assessing the voucher system as very positive: "The voucher system is an interesting approach for research promotion. It has demonstrated its success in other European regions already. In Saxony-Anhalt, there is a specific need for such a system", said Dr. Gunthard Bratzke, Managing Director of the Institute for Structural Policy and Economic Development (isw). Dr. Ulrich Buller, Director of the Fraunhofer Institute for Applied Polymer Research (IAP), agreed to this: "The voucher system is developing right on time … we need a demand-oriented research program."

The ChemSME Project is looking for ways that especially SME get access to the Pilot Plant Centre which is unique in Europe on the field of polymer synthesis and processing. During the workshop the attendees got a guided tour in the research facilities of the Pilot Plant Centre. After the workshop a Joint Statement was signed to enhance the experiences from Limburg and to evaluate the possible implementation of a Voucher in Saxony-Anhalt.

Joint Statement

Transfer of experiences with the utilisation of the Voucher-System to exploit high-quality research infrastructure

Schkopau, December 2005

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Speaker of the Central German Cluster Chemistry/ Plastics

Dr. Ulrich Buller
Fraunhofer Institute for Applied Polymer Research

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