14 May 2003

9th PIN meeting, London

Frank Agterberg, CEFIC Research & Science

"Towards a sustainable European chemical industry "

Jan Dopper – Member of the Cefic R & S Board – Member of the Board of Directors DSM

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SUSTECH

1

2

Societal acceptance dilemma:
Innovative chemistry : accepted (and expected !)
versus Production technology: fears and concerns

(despite concerns on product safety, toxicity and traceability)

– **New <u>molecules</u>**
(therapeutic drugs, food additives, …)

– **New <u>products</u>**
(water–based latex paints, polymer textile fibers, …)

– **Industrial RISK**
(Bhopal, Toulouse, …)

– **Energy consumption**
(CO_2,greenhouse effect, ...)

– **Air and water pollution**

– **Soil contamination**

(despite general acceptance of the manufactured PRODUCTS)

3

<u>Why</u> keep chemical production technology in Europe?

– employment (~ 2 million directly)
– balance of payments (2001 519 billion sales, + € 65 billion trade balance!)
– autonomy (economic independence !)

<u>How</u> can we keep production technology in Europe, remain competitive, and contribute to sustainable development ?

➔ Framework conditions

4

Cefic vision & mission

Vision

Chemistry making a world of difference

Mission

To maintain and develop a prosperous chemical industry in Europe by promoting the best possible economic, social and environmental conditions to bring benefit to society with a commitment to the continuous improvement of all its activities including its safety, health and environmental performance

5

CEFIC prog's address key issues

- **EU Chemicals Policy Review**
- **competitiveness**
- **international trade**
- **Single Market and EU enlargement**
- **safe distribution and transport of chemicals**
- **climate change and energy consumption**
- **global chemicals management and product safety**

Research & Science provides a basis for good issue management

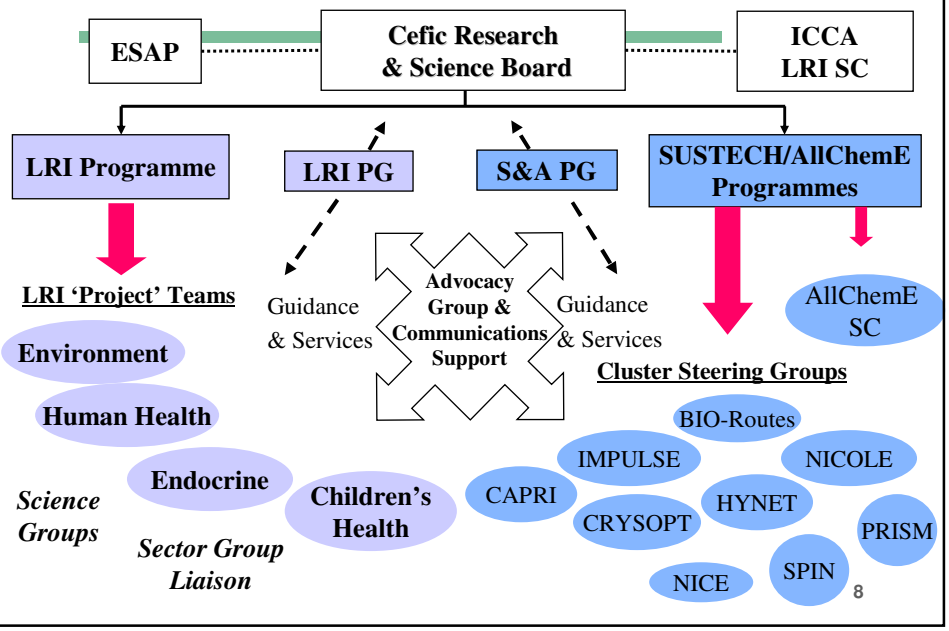
6

Research & Science Programme

Objectives

- Integration of Research & Science to achieve focus and leverage:
  Within the CEFIC Structure
  With other Associations (e.g ACC, JCIA)
  with External Partners
- Evaluate and Optimise External R & S Networks
- Align R & S programme with evolving business requirement
- Contribute to proper use of science in decision making

R&S organisation



Sustainable Development

Development that meets the needs of the current generation without compromising the ability of future generations to meet their needs.

Triple bottom line

- Economic
- Social
- Environmental

Chemical Industry contribution to Sustainable Development*

1. **Chemicals Safety (RC, HPV, LRI)**
2. **Innovation (SUSTECH)**
3. **Capacity building (RC, PS)**
4. **Globalisation (BAT, trade liberalisation)**

* **ICCA Report "On the road to sustainability" (www.icca-chem.org)**

9

Chemical Industry Contribution to SD

1. **Chemicals Safety**
   - **Responsible Care**
   - **HPV programme**
   - **LRI**
2. **Innovation**
   - **New products and processes with improved P3-performance**
   - **SUSTECH**
3. **Capacity building**
   - **Responsible Care**
   - **Product stewardship**
   - **UNEP Action Programme for Emergencies at the local Level (APELL)**
4. **Globalisation**
   - **Technology transfer (BAT) to developing countries**
   - **Trade liberalisation WITH sound environmental policy development**

10

Role of innovation towards Industrial Sustainability

- According to the Organisation for Economic Cooperation and Development (OECD), industrial sustainability is the continuous innovation, improvement and use of clean technologies to reduce pollution levels and consumption of (non-renewable) resources.

- SUSTECH contributes to this with programmes on pre-commercial technology development aimed at (eco-efficiency):

  - ✓ Increasing Materials and energy efficiency
  - ✓ Minimising emissions of toxic substances and greenhouse gases (incl. remediation of contaminations)
  - ✓ Enhancing materials recyclability
  - ✓ Maximising use of renewable resources
  - ✓ Sustainable use of products, i.e. Extended product durability and substitution principle
  - ✓ Increasing benefits from goods and services

Some industrial examples

- Membrane processes replacing Hg for PVC (outphased 2020)
- Fluidized bed production of PP replacing suspension-based processes
- Lanthanides replacing heavy metals as dyes and fuel additives

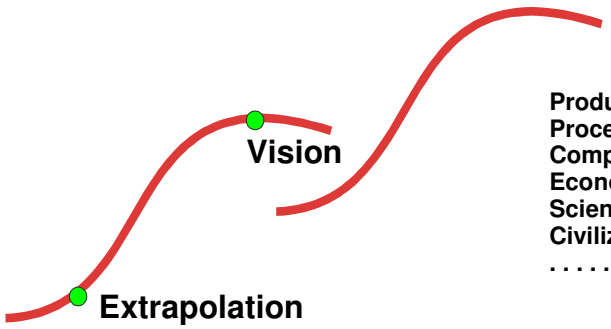
- Uniquema's frying oil waste to high grade stearine for i.e. rubber tyres, and squalene from olive oil waste instead of from shark livers
- Thomas Swan's supercritical fluid-based fine chemicals plant

- Cargill Dow's NatureWorks PLA
- Monsanto's BioPol (improved by Metabolics, US)
- Ecothene ...?

- Rent-a-solvent (Safechem Umwelt service SafeTainer
- Paint mercedes A-class car on spec

12

Incremental changes and paradigm shifts….



Products
Processes
Companies
Economics
Scientific theories
Civilizations
. . . . . .

Max Planck: "A new theory defeats the old one, not because the supporters of the old one become convinced but because they die"

13

SUSTECH

CEFIC's programme to promote collaborative research on sustainable technology. SUSTECH brings together the European chemical industry, universities and other research institutes to operate self-managed research programmes that are funded by programme members and other research funding agencies.

Mission

To strive for the development of innovative technologies that will enable the chemical industry at large to visibly contribute to a more sustainable world

Strategic Objectives

- **Establish the scope and foster a coherent set of prioritised R&D programmes that commands broad support from across the Cefic membership**
- **Mobilise the collective expertise and build partnerships between industry and academia that attract funding to undertake research within a common framework of governing principles**
- **Position Cefic as a competent partner of choice for the European Commission in its drive towards a more sustainable industrial sector**
- **Position the chemical industry as a net contributor to a more sustainable world**

14

http://www.cefic.org/sustech

SUSTECH OPERATES VIA A RANGE OF THEMATIC TECHNOLOGY CLUSTERS OR NETWORKS

HyNet
The Hydrogen network

NICOLE
Network for Industrially Contaminated Land in Europe

CAPRI
Competitive Advantage through Process IT
Competitive Advantage through Process IT / Computer Aided Process Engineering

MixNet
A thematic Network on Fluid mixing

CRYSOPT
A Thematic Network on Industrial Crystallisation

NICE
Network for Industrial Catalysis in Europe

SPIN
Solids Processing Industrial Network

IMPULSE
Integrated Multiscale Process Units with Locally Structured Elements

15

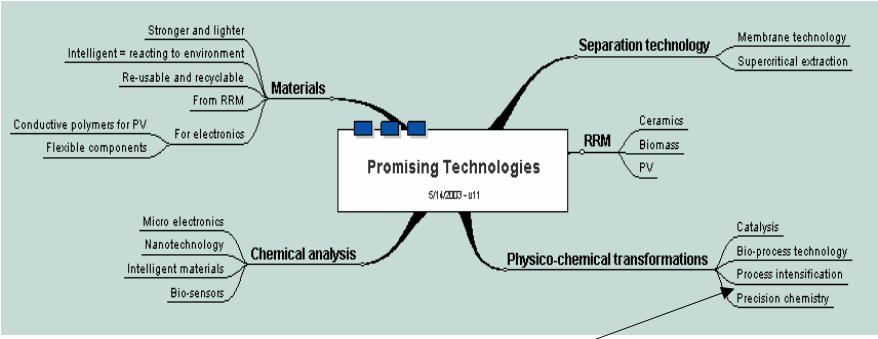
SUSTECH

Main Achievements

- **Creates opportunities for Cefic members to form research consortia:**
  - on generic issues e.g. Nicole (remediation technologies for industrially contaminated soils and sediments), Prism (integration of 'the human factor' in process design), Spin (solids processing)
  - on specific technologies e.g. Nice (catalysis), Crysopt (crystallisation)
  - Across the value chain e.g. Hynet (hydrogen storage & transport hydrogen technology – fuel cells – automotive – electronics ind.)
- **Supports/Helps Cefic's participation/representation in SD & RTD policy discussions with EU institutions or other international bodies e.g.**
  - RTD framework programme 6 & More RTD for Europe (2001–ongoing)
  - Innovation policy (2003 – ongoing)
  - Environmental policies – ETAP (SCP 2002 –ongoing)
  - Industry policy – MATAP (2001 –ongoing)

6

What specific challenges?



- IMPULSE
- ……

17

IMPULSE

Integrated Multiscale Process Units with Locally Structured Elements

Scope
- Structure of chem. Process equipment adapted to chemistry
- Scale-up by « multiscale construction » - flexible, intelligent, safe, clean
- Local internal process control (integrated sensors / actuators)

Technical Objective
- Multi-scale design concept, apply to large scale production

Activities
- Inventory of existing knowledge, technical and other requirements
- Specification of equipment incl. interconnection and integration of control devices (standards)
- Build equipment, demonstrate
- Develop methodology
- Disseminate knowledge

Partners
- Chemical producers, equipment suppliers, universities/institutes.

Readiness
- FP6 IP proposal submitted 6 March 2003

N.B. **Competition** from **Japanese METI/NEDO EUR 35 MM project 'Micro chemical process technology'. Partnership involves ~30 companies**

18

SUSTECH: what's next? Technology Platforms!

- **Long term activities with the potential for game changing impact on the industry.** Examples from the Aeronautical industry include completely new generations of cabin design, wing design and systems design (power optimisation, electronics), i.e. they are highly specific.
- **The objective should have the twin attributes of:**
  - **a material improvement in industry competitiveness**
  - **a major positive impact on society**
- **Collaboration – across the industry, across the supply chain, with other stakeholders**
- **Appropriate for funding from various phases of EU Framework funding i.e. the platform is an overarching technology theme**
- **Mechanisms to translate science and technology efficiently into profitable business**

In preparation:

- **TP White Biotechnology**
- **TP water**

19

SUSTECH event 2003

11 & 12 June 2003, Brussels

Objectives

- **Seek industry needs (for future consortia, TP's)**
- **Best practices in joint RTD**
- **Concerns & answers (i.e. IPR)**

More info on SUSTECH: www.cefic.org/sustech

E-mail: sustech@cefic.be

20