FISCH

Flanders strategic Initiative for Sustainable CHemistry

IWT-feasability study 12/2008-12/2009

A strategic initiative for sustainable development with clean chemistry.

A Flemisch SUSCHEM-platform supported by all stakeholders with ‘sustainability’ als the only decisioncriterium for all its society-driven activities.

Report SCHO^{6}K-questionnaire (April-May 2009)

www.fisch-essenscia.be

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SCHO^{6}K Questionnaire (April-May 2009)

SCHO6Kenquete

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Questions asked (LE+KC):

Q1. Which of your strategic R&D areas are related to sustainable chemistry?

Q2. How much resources do you allocate for this at the moment (money, infrastructure and people) ?

Q3. What is the trend (increasing/decreasing) of these R&D activities for the next 5 years?

Q4. Which of those R&D activities do you realise yourself; what do you outsource, what is outsourceable in Flanders?

Q5. Are you willing to start an open strategic knowledge alliance (a **SCHO^{6}K**) with university associations, knowledge centres and companies which are active in the chemical value chain (chemical industry, life sciences, plastics, textile, food, …) and to open your R&D activities to the other 4 knowledge objectives?

Q6. Your terms to participate to such SCHO^{6}K

Q7. In which SCHO^{6}K are your willing to invest (can be a new SCHO^{6}K as well)

Q8. Concerning the possible SCHO^{6}K '**Cluster of pilot plants and application labs**'.

- Which activities from this SCHO^{6}K do you wish to use (demand)?
- Are you willing to open up your activities/installations for this SCHO^{6}K (offer)?

Q9. Your terms for opening up your activities for this SCHO^{6}K

Q10. Concerning the possible SCHO^{6}K '**Biomass conversion**'. If you are interested in 'greening' your (bulk)chemicals (= to obtaining from renewable sources), what would then be your top 3 of the renewable molecules that this Flemish alliance should realise?

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Results SCHO^{6}K Questionnaire (April-May 2009)

- filled in the questionnaire: 51 (**17 LE**, **14 SME**, **20 KC**)
- Q3: trend of R&D-activities related to SUSCHEM: **increasing**
- Q5: large **willingness to invest in SCHO^{6}K** (LE+KC)
  - → R&D (LE14, KC18), Training (LE11,KC17), Education (LE10, KC16), Open (LE13, KC17)
- **Q6+Q9: Terms to participate in SCHO^{6}K**

	LE	SME	KC
Added value, generate recurring income, balance between effort and expected return, relevant to Business Strategy, short to mid term result, low participation cost for SME	X	X	
Clear access rules for **knowledge +valorisation** (IPR and ExploitationR)	X	X	X
Fit with partners, not with **direct competitor** (first stage), confidentiality rules, access rules for SCHO^{6}K (added value of participants, high competence level and clear commercial interest , not general intrest, of all participants).	X	X	X
Locate in existing industrial sites and/or KC, **facilitate and leverage** the administrative and financial aspects and cofinance	X		
Size and organisation of consortium (transparancy, efficiency, professionality, finance, long term vision, technological challenge, room for fundamental research)			X
Obtain funding (via government and/or industry) to perform research in strategic R&D areas related to sustainable chemistry. Having freedom to launch initiatives in these domains.			X
Projectcompetition: Call for projects, call for needs, Projectcompetition		X	

SCHO^{6}K Questionnaire (51 organisations, april-may 2009)

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17LE+20KC: In which SCHO^{6}K are you willing to invest ? **14SME: At which SCHO^{6}K are you willing to participate ?**	**LE**	**SME**	**KC (knowl. center)**	**Sum of potential partners**
1. biomass conversion	8	7	12	**27**
your top 3 renewable chemicals — organisations	*8*	*3*	*3*	*13*
chemicals /molecules	*25/22*	*8/7*	*9/7*	*42/32*
2. micro-algae	4	3	3	**10**
3. valorisation of side or waste streams	4	9	6	**19**
4. separation technology	5	7	7	**21**
5. green solvents	5	6	3	**14**
6. micro-technology	3	1	4	**8**
7. catalysis and alternative energy input	4	7	8	**19**
8. multifactorial high-throughput methodologies	4	3	5	**12**
9. criteria, measuring methods and business models for sustainable chemical products and processes	9	6	7	**21**
10. cluster of pilot plants and application labs	9	7	10	**26**
R&D/pilotplant /application lab/production — offer	*8/11/7/7*	*6/5/2/3*	*14/10/8/5*	*28/26/17/15*
demand	*10/10/11/8*	*5/6/6/5*	*5/10/5/6*	*20/26/22/19*
Sum →	55/17 = 3,2 mean	56/14 = 4 mean	64/19 = 3,4 mean	**175/49** **= 3,5 mean**

SCHO^{6}K Questionnaire (April-May 2009)

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Possible new SCHO^{6}K	LE	SME	KC
Possible new SCHO6K related to existing SCHO^{6}K			
business assets for sustainable development (activity for the FISCH-platform)		X	
green chemistry (all themes)		X	X
procesintensification (one of the 3 breakthrough domains above 5-7)	X		X
biobased materials (activity line under 1)			X
membranes (activity line under 4)	X		X
microfluidics (activity line under 6)	X		X
production of electrochemicals (activity line under 7)	X		
multifunctional materials (activity line under 9)	X		X
sustainable (i.e. renewable) materials (activity line under 9)	X		X
product safety (activity line under 9)			X
consumer and market analysis (activity for the FISCH platform)	X		
metrics for sustainable development (activity line under 9)		X	
Possible new SCHO6K <u>not</u> related to existing SCHO^{6}K			
consumer products	X		
rapid prototyping chemicals	X		
carbon capture and storage	X		
renewable energy		X	

FISCH Breakthrough theme 'Alternatives for fossiles':
Possible programs and program lines

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Biomass convertion

- White biotechnology
- (Fine)chemicals from biomass
- Biocatalysis
- Chemical catalysis
- New bulk chemicals with a totally different downstream chemistry
- Alliance for the development of renewable molecules

Micro-algae

- Biomass for the extraction of chemicals for (animal)food, energy production and biofuels
- Grow on N-containing waste waters and waste air (NOx+CO2)

Valorisation of side- and waste streams

- Closure of the loop to non-energy aplications
- Gasification to synthesis gas
- Fermentation to methane-gas
- (bio)chemical convertion to products

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FISCH Breakthrough theme ‘Proces Intensification’

Possible programs and program lines

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Seperation technology

- Membranes
- Reactive distillation and cristallisation
- Coupling of microreactors and seperation, membranecatalysis

Green solvents

- Solventfree reactions
- Ionic liquids, supercritical fluïda

Micro-technology

- Microreactors and modular procesunits
- Micro-fluïds

Catalysis and alternative energy-input

- Catalysis (homogene, heterogene, biological and chemical, integrated in microreactors en membranes)
- Microwaves, ultrasound, ultrasound, magnetism
- Static mixers and mixing magnets
- Electrochemical production of chemicals
- Fotocatalysis to chemicals (without biomass intermediate)

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FISCH Breakthrough theme 'Sustainable chemical products and processes': *Possible programs and program lines*

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Multifactorial high-throughput O&O

- Productoptimisation (replacement of chemicals in formulations, tox-tests)
- Procesoptimisation (chemical reactions, catalysis, seperation techniques)

Criteria, measuring methods and businessmodels for sust products and processes

- Sustainability analysis (criteria and measuring methods)
- REACH en replacement of chemical products
- Impactanalysis environment and toxicity (fast and reliable tox-tests and tox-simulations)
- Productrisks (labelling, productstewardship, safety of the foodchain, indoor-air, allergenes)
- Flemish servicessector for productsafety
- New businessmodels (CTC, chemical leasing, logistic concepts, …)
- Integrated product management system

Sustainable materials

- Biobased materials
- Renewable materials
- Multifunctional (smart) materials
- Materialintensification and making existing products more sustainable

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