

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.

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www.fisch-essenscia.be

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Flanders in Action !

Jan 2009

'10 potential new large breakthrough RDI-institutes in Flanders

- Transport-logistic services-supply chain management
- ICT en services for healthcare
- Healthcare: translational research → SOC CMI granted (05/2009)
- Healthcare: relation food and health
- Nano-electronics: complex heterogene systems
- Strategisch initiative materials → SOC SIM granted (06/2009)
- Making industry
- **Sustainable Chemistry** → **feasibility study FISCH ongoing**
- ICT for socioeconomic innovation
- Intelligent energynetworks → **feasibility study SMARTGRIDS ongoing**

Prerequisite = strong businessplan

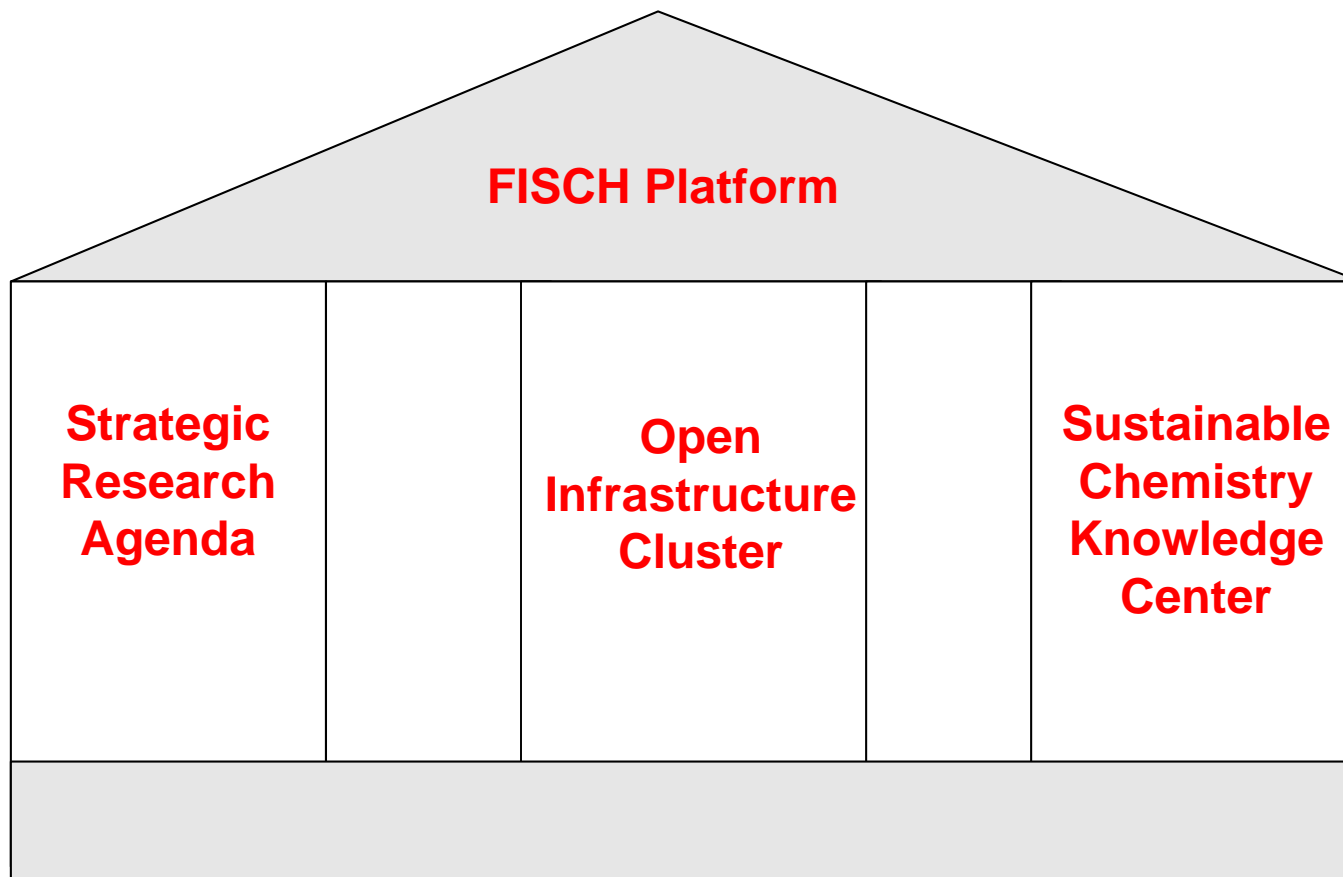
- Research + Development + Entrepreneurship
- Large acceptance at industry + knowledge centers
- Large (international) activity (ambitious)
- Multidisciplinary - multisectorial (value chains)
- Sustainable = green + blue (jobcreation in Flanders)

FISCH platform with 3 strategic pillars



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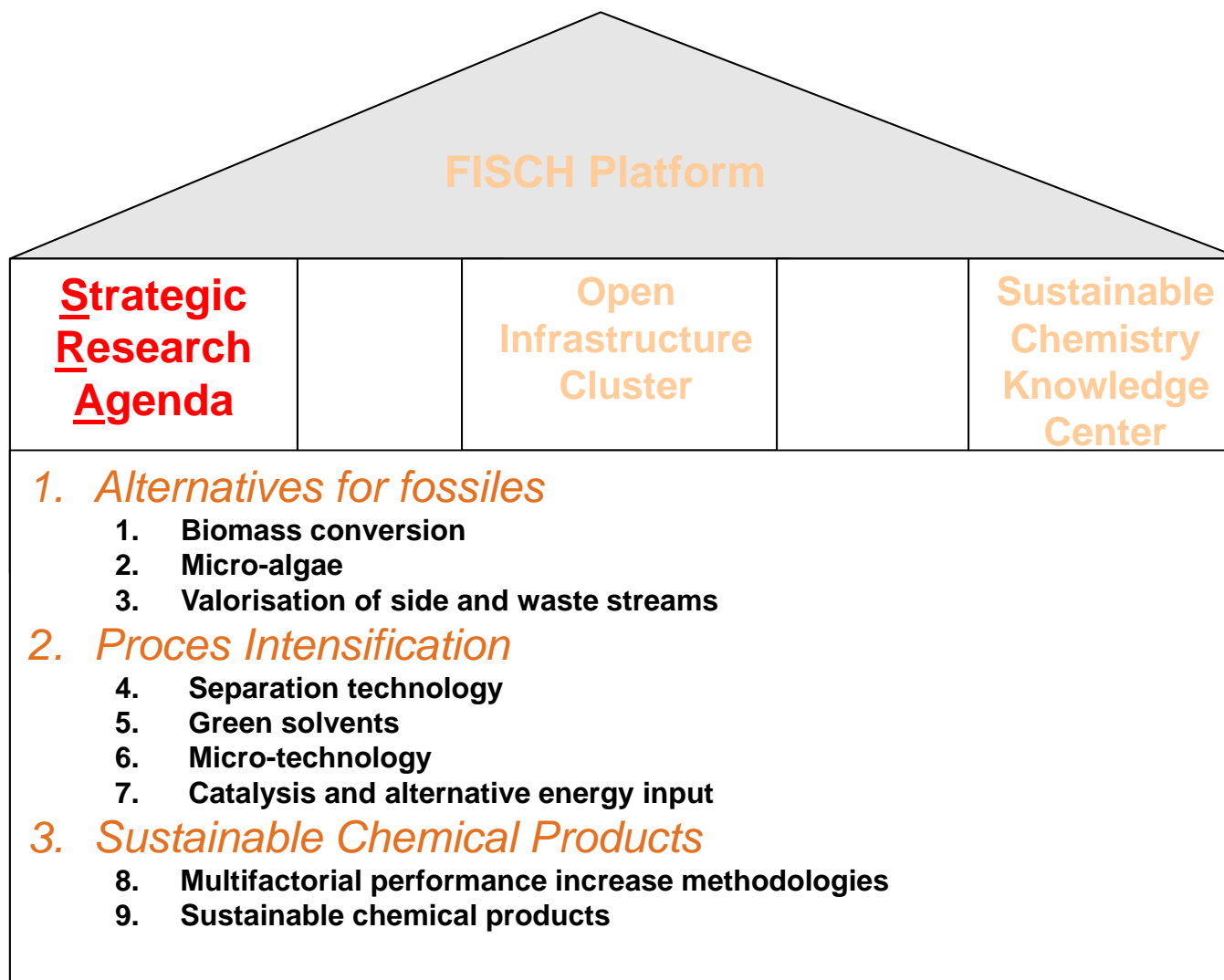
Strategic pillar 1

Breakthrough domains = SRA1,2,3



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Breakthrough domain: *'Alternatives for fossiles'*

1. 'Biomass conversion'

- White biotechnology
- (Fine)chemicals from biomass
- Biocatalysis
- Chemical catalysis
- New bulk chemicals with a totally different downstreamchemistry

2. 'Micro-algae'

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

3. 'Valorisation of side- and waste streams'

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

Breakthrough domain: '*Proces intensificatio*n'



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4. 'Separation technology'

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

5. 'Green solvents'

- Solventfree reactions
- Ionic liquids, supercritical fluïda

6. 'Micro-technology'

- Microreactors and modular procesunits
- Micro-fluïds and flow chemistry

7. 'Catalysis and alternative energy-input'

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

Breakthrough domain: *'Sustainable chemical products'*



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8. 'Multifactorial performance increase methodologies'

- Productoptimisation (high-throughput methodologies, replacement of chemicals in formulations, tox-tests)
- Procesoptimisation (high-throughput methodologies, datamining, predictive simulations)

9. 'Sustainable chemical products'

(chemical product = atom, molecule, chemical, material and their mixtures)

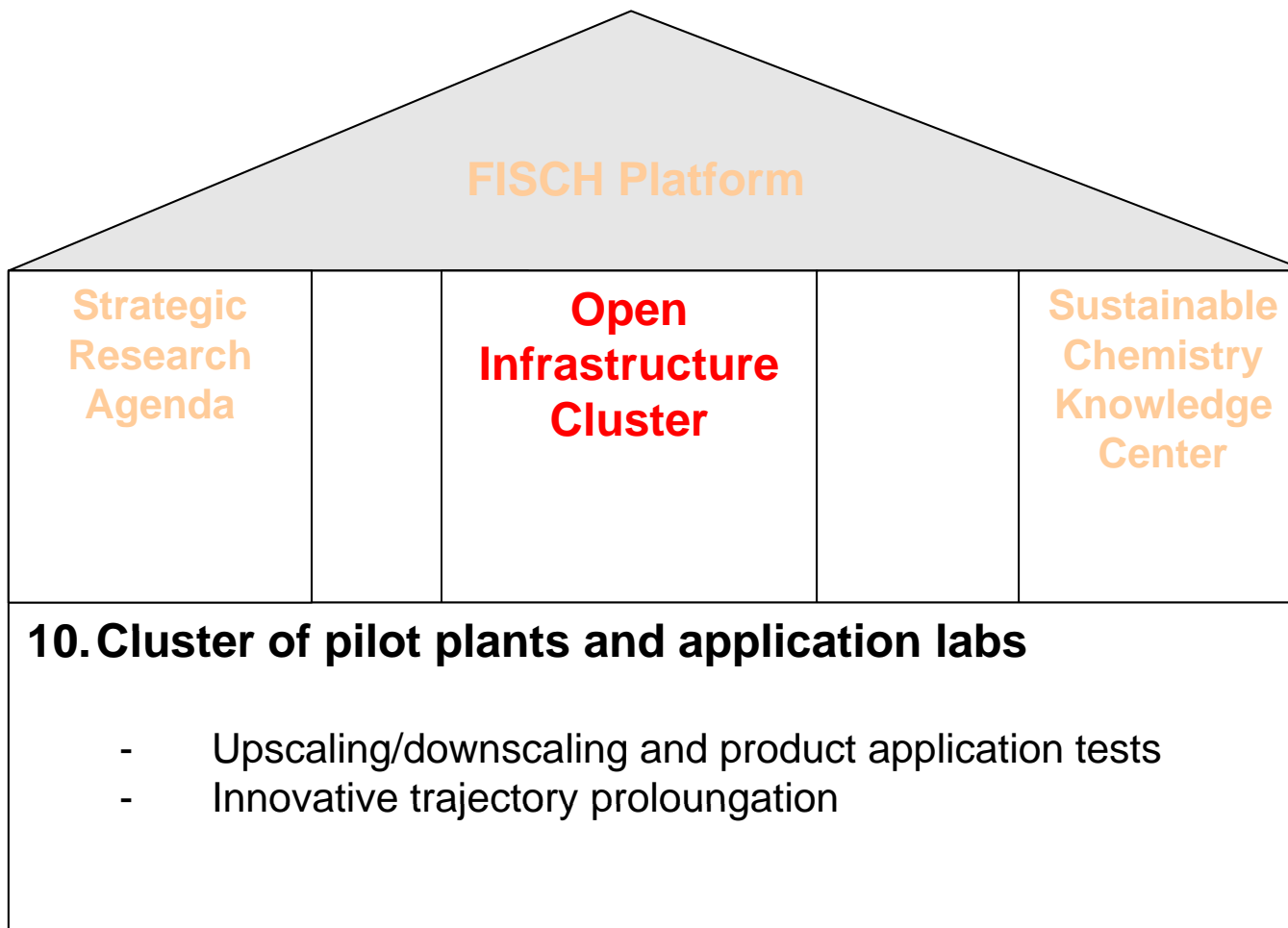
- Biobased and renewable (incl. monomers CO₂, amino acids, sugars, fatty acids, alcohols, ..., incl. modification of natural chemicals, i.e. starch, cellulose, ...)
- Biodegradable, recyclable and upcyclable chemicals
- Making existing chemicals more sustainable (productintensification)
- Multifunctional (smart) chemicals

Strategic pillar 2



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Strategic pillar 3



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FISCH Platform

Strategic
Research
Agenda

Open
Infrastructure
Cluster

Sustainable
Chemistry
Knowledge Center

11. Criteria, measuring methods, business models, management models and societal expectations for sustainable chemical products and processes.

a. criteria and measuring methods for sustainable development

b. transition management

c. societal expectations

- Sustainability analysis
- REACH and 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 servicesector for product- and processafety (incl. non-destructive maintenance)
- Innovative business models (CTC, chemical leasing, logistic concepts, ...)
- Innovative management models (integrated product management system, clustermanagement, ...)



FISCH PLATFORM: timing



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1. *Business plan FISCH platform* 12/2009
 - beoordeling / evaluatie mid 2010

2. *FISCH Platform*
 - beslissing locatie en financieringsvoorstel 11/2009
 - operationeel (Quick start) 01/2010

3. *Vanaf 2011*
 - structurele financiering
 - eigen calls voor coöperatieve projecten (naast individuele projecten)
 - start visibiliteitsproject in breed kader (publiek, opleidingen vorming).



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Quick start-up FISCH platform: project-consortia

blue = started or emerged during the FISCH-study

black = already existing projects

		Network	Basic research FISCH-projects	Partners	Cooperative O&O-FISCH-projects	Consortia
FISCH platform		- SUSCHEM Flanders - FISCH-TIS1 (*)			- EWI cluster policy - Hexagon	- EWI, essenscia vl., (Fedustria) - Ecosynth
SRA	Petroleum alternatives	- CINBIOS (TIS+TD) - Vlaams Algen Consortium - FISCH-TIS2 (**)	- SBO greenhouse gases - SBO sunlight - TETRA bicycle		- Multipurpose-plant for 2000 ton/year algae - Carbon Closed Cycle Chemicals: renewable alcohols	- Vlaams Algen Consortium, Hoge Maey, MBO NOx companies - Taminco, Transfurans, Borealis, Ecosynth, (Total), Value-for-technology, Oleon, KUL, UHasselt, VITO
	Proces-Intensification	- Belgian Membrane Group - FISCH-TIS3 (***)	- SBO ionic liquids - SBO chroma-chip - SBO OCEPC - SBO microreactors - SBO homogene catalysis	- VITO, KUL, companies - UGent, KUL, UBrussel, VITO, companies - UAntw, KUL, VITO, companies	- (Multi-purpose micro reactor) - Green solvents	- See SBO microreactors - Taminco, Janssen Pharmaceutica
	Sustainable chemical products	- TIS Smart Materials (Centexbel+Siris) - TIS 'Accelerate' (Flamac, essenscia vl., Agoria) - FISCH-TIS4 (****)	- Plan C, SIM and CP PlasticVision projects		- Plan C, SIM and CP PlasticVision projects - CO 'PVC weakeners' - CO 'Fast toxicity testing'	- Centexbel, Flamac, PVC users, PVC producers - Taminco
Open Infrastructure Cluster		- Feasibility studies FISCH and FLOW - FISCH-TIS 1,2,3,4 - BioBaseEurope			- Interreg 4 Pilot BioBaseEurope - EFRO 'sustainable packaging' - Feasibility study FLOW	- P&G, VKC, Federplast - essenscia vl, P&G, steering group (IVP, Detic, Food, Farma)
Knowledge Center for sustainable chemical products and processes		- PRODEM - Plan C - VLARIP - FISCH-TIS 1 (*), 4 (****)			- Chemical leasing - EFRO ECO ² CHEM	- OVAM, Plan C, essenscia vl., (Agoria) - essenscia vl., UGent, VITO, companies

For all 4 TIS the applicant is essenscia vl.

(*) FISCH-TIS1: 'FISCH platform = SUSCHEM Flanders network': essenscia vl. (0,5VTE) / UAntwerpen (0,5 VTE) / KUL (0,5 VTE) / VITO (0,5 VTE)

(**) FISCH-TIS2: 'Petroleum alternatives' (Biomass conversion, Micro-algae, Side- and waste streams): UGent (1VTE); UHasselt (1VTE)

(***) FISCH-TIS3: 'Proces Intensification': VUB (2 VTE)

(****) FISCH-TIS4: 'Sustainable chemical products': UAntwerpen (1VTE), VITO(0,5VTE),KUL(0,5VTE)

FISCH PLATFORM: financieel (voorstel)



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FISCH Platform	Strategic Research Agenda	Open Infrastructure Cluster	Knowledge Center for Sustainable chemistry
2010/2011 IWT TIS 1	<ul style="list-style-type: none"> - IWT TIS 2, 3 en 4 - IWT <u>S</u>trategisch <u>B</u>asisch <u>O</u>nderzoek - IWT Coöperatieve <u>O</u>&<u>O</u> - IWT <u>C</u>ollectief <u>O</u>nderzoek 	<ul style="list-style-type: none"> - IWT TIS 1, 2,3 en 4 - IWT study FLOW - EFRO 'Sustainable packaging' 	<ul style="list-style-type: none"> - EFRO Eco2Chem - IWT TIS 1 en 4
		Beperkte structurele financiering	
>= 2011	Structurele financiering		
	Visibiliteitsproject		

FISCH PLATFORM: next events



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13 october 2009: Kékulé cyclus
UAntwerpen

Februari 2010: FISCH slotevent