

The Knowledge-based Bio-Economy in Germany and North-Rhine Westphalia

- Future perspectives for cooperation

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Moscow, November 12th 2009

What is the Knowledge-Based Bio-Economy?

The knowledge base: Advances in Life Sciences and Biotechnologies in convergence with other technologies such as nanotechnologies, chemistry, information technologies..,

The Bio-Economy: Includes all industries and economic sectors that produce, manage or otherwise make use of biological resources including bio-waste.

The European bio-economy has an approximate market size of over €1.7 trillion, employing more than 22 million people

→ 4 Fs: Food, Fiber, Fuel and Feed

Sector	Annual turn-over (billion €)	Employment (million)	Data source
Food	920	4.4	CIAA
Agriculture	210	15	COPA-COGECA
Paper/Pulp	400	0.3 direct (4 ind.)	CEPI
Forestry/Wood industry	150	2.7	CEI-BOIS
Industrial Biotech.	50 (est.)		McKinsey*
Total	1730	22.4	

* estimated to be 10 % of sales within the chemical industry accounting for €125 million by 2010

What are the driving forces behind the Knowledge-Based Bio-Economy beyond competitiveness ?

Global challenges like :

- Growing and aging populations
- Increased demand for high quality food and sustainable food production
- Increased incidence of food-related disorders (cardiovascular, obesity..)
- Increased demand for feed
- Increase in infectious animal diseases and zoonoses
- Danger of plant diseases, new pathogens and pesticides
- Limited resources of raw materials and energy
- Threat of global warming and other global changes (biodiversity loss etc)

What is the Knowledge-Based Bio-Economy offering?

- **Improved health**
 - Food with improved nutritional value, increased food safety, new treatments, diagnosis and vaccines against human and animal diseases, improved feed...
- **Sustainability and a cleaner environment**
 - Energy and water saving production and processes in agriculture and industry ; decreased dependence of fossil resources;
- **Support to rural development**
 - Use of “set-aside” land; cultivation of new crops; decentralised production facilities
- **Increased industrial competitiveness through innovative eco-efficient bio-based products**

Cooperation – Collaborative Research

Ten themes

1. Health
 2. Food, agriculture and fisheries, and biotechnology
 3. Information and communication technologies
 4. Nanosciences, nanotechnologies, materials and new production technologies
 5. Energy
 6. Environment (including climate change)
 7. Transport (including aeronautics)
 8. Socio-economic sciences and the humanities
 9. Space
 10. Security
- + Euratom: Fusion energy research, nuclear fission and radiation protection

How is KBBE implemented in various **EU Member States** ?

3 Different Stages of Implementation of KBBE:

- **Integrated concepts and strategies** with different levels of integration (AT, BE, DE, IR, NL, TR)
- **No integrated strategies** BUT specifically KBBE-related policies and activities (CZ, FR, SE, UK)
- More or less **no specific activities and policies**, but acknowledgement of its political importance and potential (EE, GR, LT, SI, PT)

Integrated KBBE Concepts - **Germany**

- **“Cologne“-Paper** - „En route to the Knowledge-Based Bio-Economy“ during the German EU presidency in 2007
- Several **Calls for Proposals** with direct KBBE references
- **High-Tech Initiative** of the German Federal Government, linking with the KBBE-concept
- **National Bio-Economy Technology Council**, directly reporting to the Chancellor
- Explicit reference to the KBBE and the need for its establishment with the support of the National Bio-Economy Technology Council in the **Coalition Agreement** of the new German government

Current Calls for Proposals with direct reference to KBBE in **Germany**

Federal Ministry of Education and Research:

- **Competence Networks** in Agricultural and Food Research
- **Bioenergy 2021**
- **BioIndustry 2021**
- Industrial Genome Research on Microorganisms (**GenoMik-Industry**)
- **SynRG** – Systems Biotechnology for sustainable resource production
- “Transnational **PLant Alliance** for **Novel Technologies** - towards implementing the Knowledge-Based Bio-Economy in Europe” (**PLANT-KBBE**) – Cooperation between DE-FR-ES-PT
- **Excellence Cluster Competition**
- Breeding research and Breeding for energy plants
- Support of the use of biomass for energy
- Nutrition research for a healthy life

Current Calls for Proposals with direct reference to KBBE in **Germany**

Federal State Ministry of Innovation, Science, Research and Technology NRW:

- **Bio.NRW** - Industrial Biotechnology

ERA-NETs (with strong German participation):

- ERA-NET "**Bioenergy**"
- ERA-NET "**Industrial Biotechnology**"
- ERA-NET "**Plant Genomics**"
- ERA-NET "**Eurotrans-Bio**"

Example Agro cluster

- up to 40 Mill. € / 5 years

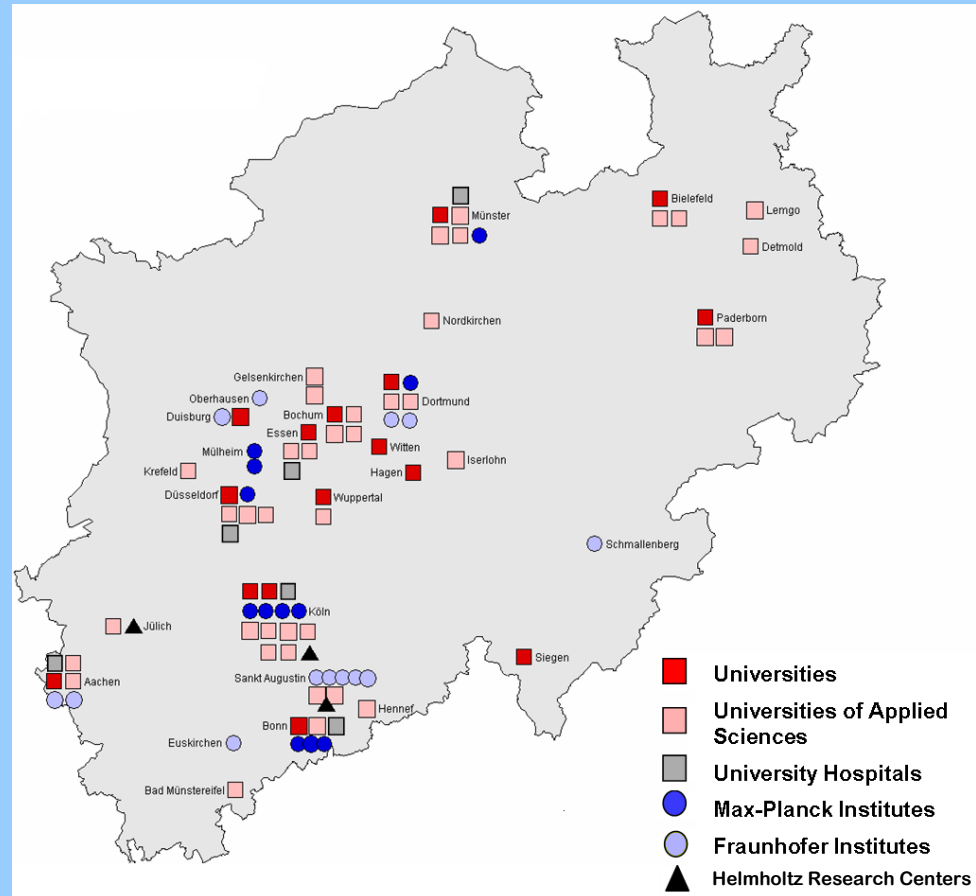
- Competence Network Food Chain Plus (**FoCus**), (coordinator: Univ. Kiel)
- **Phänomics** – a systems biological approach for geno-phenotype mapping in the context of performance, health and wellness of the companion animals cattle and swine (coordinator: Univ. Rostock)
- Complex sensor technology for agricultural crop research, breeding and canopy controlling: **CROPSENSE** (coordinators: Univ. Bonn, Forschungszentrum Juelich)
- **Synbreed** – Innovation cluster for synergistical plant and animal breeding (coordinator: TU Munich)

KBBE Implementation in North-Rhine Westfalia - Some reflections



Research facilities in NRW

Ministry of Innovation, Science, Research and Technology of the German State of North Rhine-Westphalia



NRW – a global player's place

Ministry of Innovation, Science, Research
and Technology of the German State of
North Rhine-Westphalia



26 of the 50 top-selling German companies are based in NRW

723.000 SME are based in NRW



source: NRW.INVEST GmbH (2007)

NRW – Big is beautiful

- **Nearly 1/3 of the Companies** of the Top 500 are located in NRW
- **30 of the largest cities** out of 82 in Germany are located in NRW
- Every fourth Euro invested by foreign companies in Germany goes to NRW
- **7500 foreign companies** have their head office or a representation in NRW (i.e. Vodafone, Ford, Shell)
- NRW is the **largest sales and procurement market** in Central Europe



The objective:

NRW aims to be Germany's No.1 state of innovation by 2015

Elements of the innovation strategy:

- improving overall conditions
- providing more highly-qualified workforce by increasing the amount of university places and doctoral programmes
- focusing R&D efforts on the interface of science and business

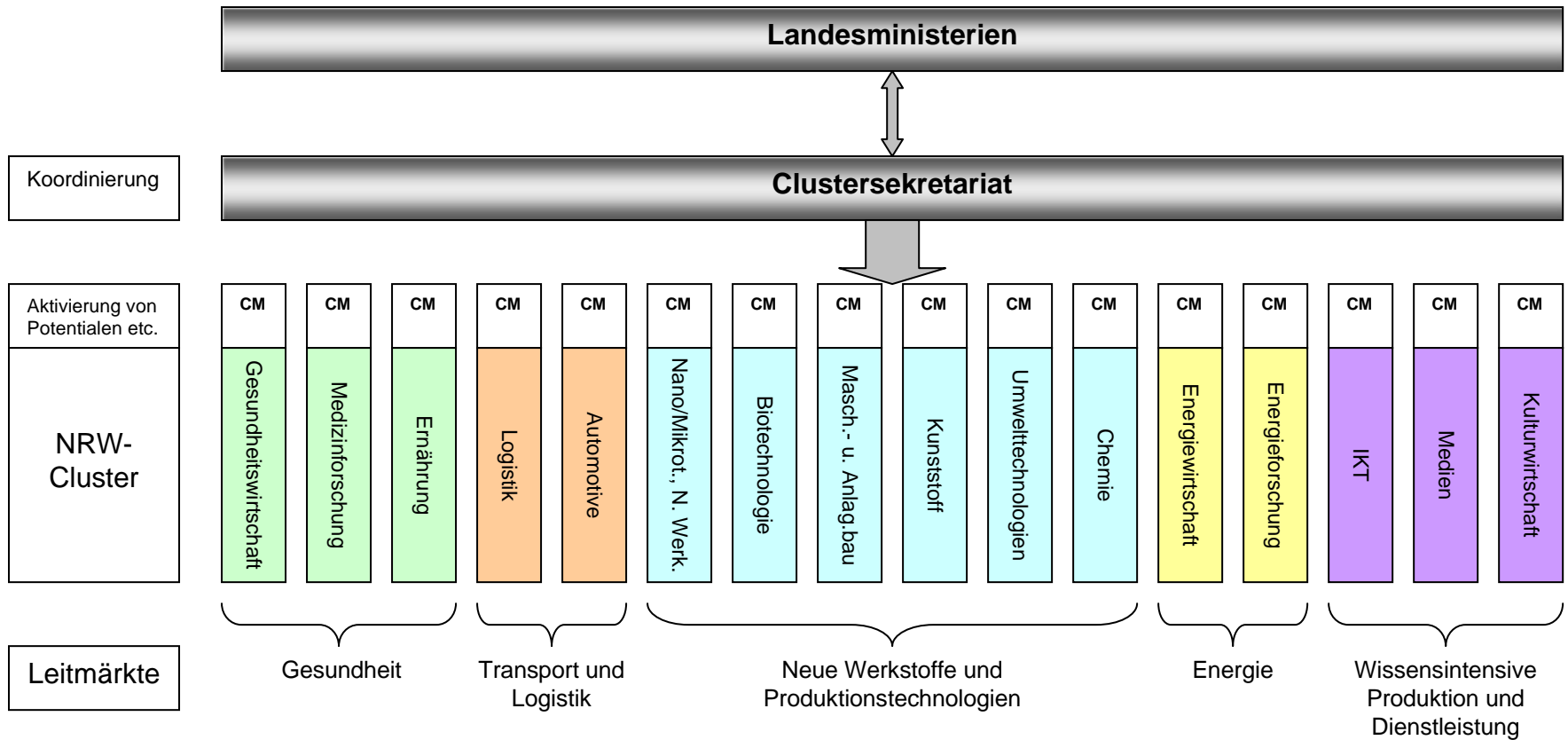


5 Lead markets are part of the comprehensive Cluster strategy of North Rhine-Westphalia:

- **Energy**
Energy industry, Energy RTD
- **Health**
Health industry, Medical Research, Food and Nutrition
- **Knowledge-intensive production and services**
IT, Media, "cultural industry"
- **New Materials and Production technologies**
Nano and micro technologies/New materials; Biotechnology;
Engineering, construction and production industries;
Chemical industry; Environmental technologies
- **Transport and Logistics**
Logistics, Automotive

Cluster Policy Made in NRW

NRW-Clustersteuerung: 16 Landescluster



Cluster Policy Made in NRW

The targets of the 16 clusters in NRW are the following:

- Strengthening of the relevant industrial site
- Strength's should be strengthened
- Increase of national and international importance
- Increase of investments in industry and research
- Promotion of creativity, self-initiative and risk preparedness
- Fast economic application of innovation and ideas for products



Achiving all these targets should increase competitiveness !

Cluster Policy Made in NRW

NRW Clustermanagement

- Directed and efficient information and communication work
- Confidence building between economy, science and public authorities
- Implementation of common interests of the cluster partners by cooperation projects
- Support for the acquisition of third party funding
- High-effective PR- and marketing activities
- Organisation of common fairs, symposia and conferences
- Measurement of the success of the network

Cluster Policy Made in NRW

NRW Cluster coordination office

- Plattform for the multidisciplinary exchange of information and experiences
- Cross-linking of the 16 state clusters in NRW
- Realisation of additional innovation potentials between the 16 clusters (cross innovation)
- Advise and support for the aquisition of third party funding
- Comprehensive PR- und media work
- Measurement of the success of the 16 clusters

Cluster Policy Made in NRW

There is no dedicated management line to identify and overcome legislative obstacles for the development of new lead markets.

However, all the tasks of the EU initiative on lead markets (overcoming legislative hurdles, better harmonisation and standardisation, intelligent use of procurement policies etc.) are indirectly contained in the tasks of the relevant managers and the overall coordination office among these 16 clusters and 5 lead markets.

We thus have a truly bottom-up approach, coming from the cluster managers and the coordination officer to promote the lead markets in NRW.

The biobased sector in NRW and the implementation of the KBBE concept

Bio-Economy Turnovers 2006 in Manufacturing Trade in **NRW**

	Billions €	
• Chemical Products	52,7	→ 75% of Chemical Intermediates in Germany come from NRW (20 bill. €)
• Rubber & Plastic Goods	13,1	
• Paper Trade	8,1	
• Wood Trade	3,4	
• Food Trade	30,2	
• Textile Trade	3,9	
Manufacturing Trade total:	26,6	

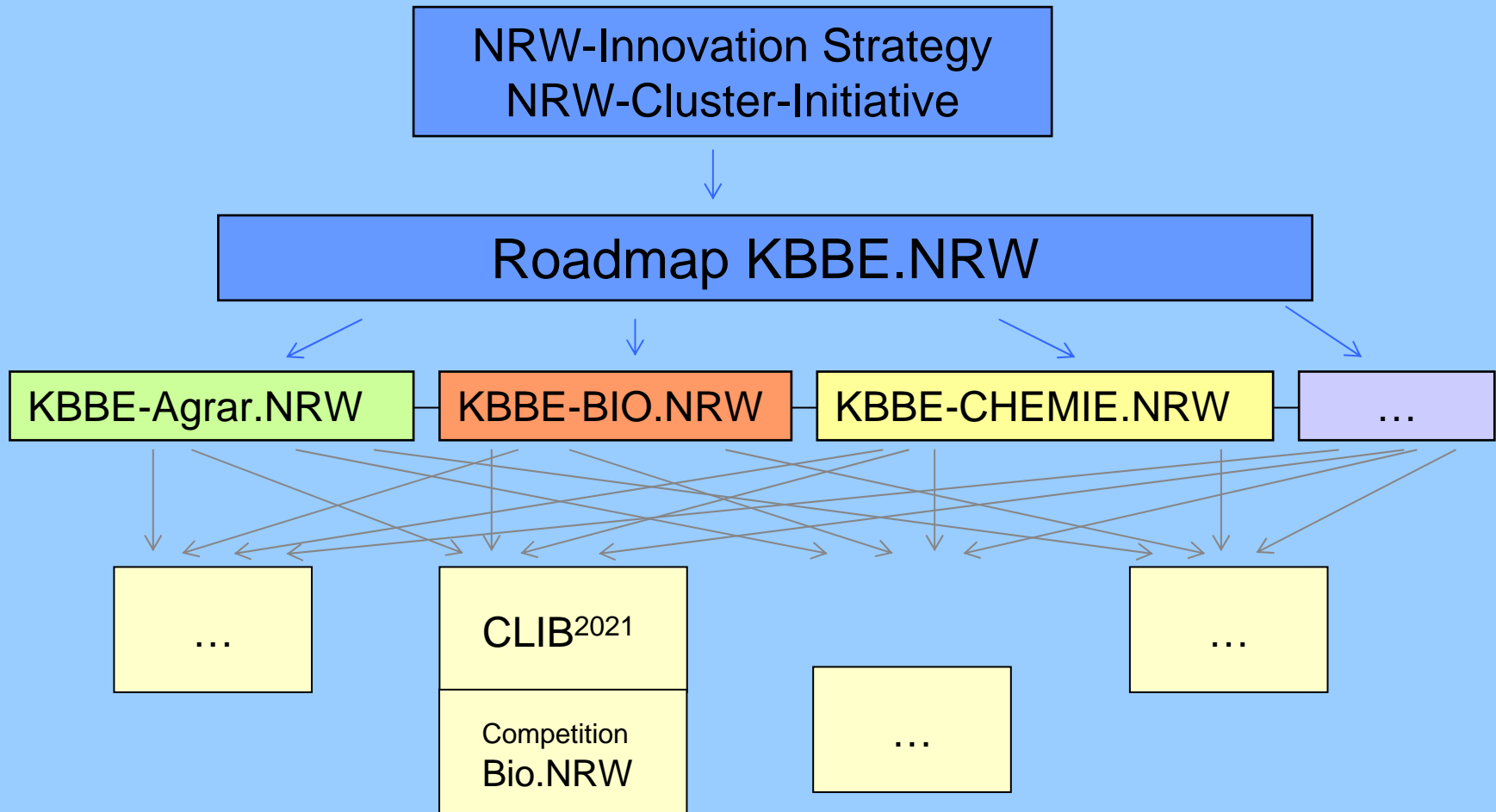
At least 30% of Manufacturing Trade in North-Rhine Westfalia is based on Bio-Economy

The biotech sector in NRW

180 biotech companies are located in NRW



NRW Innovation Strategy



KBBE activities in **NRW-1**

- Installation of 16 specific clusters by the Government of **North-Rhine Westfalia** (i.e. on Chemistry, Biotech, Energy, Plastics) with strong links of content towards KBBE
- Foundation of a **Cluster of Industrial Biotechnology (CLIB2021)** in NRW with funds of about 20 Mio. € by the Federal Government
- Foundation of an umbrella organisation “Bio.NRW” for bundling and linking-up of 8 various Bio-Regions in NRW, *now speaking with one voice !*
- Installation of a “local” agency for Bio.NRW by the State Government

KBBE activities in NRW-2

- Establishment of an KBBE Coordination Office for better coordination and streamlining of KBBE-activities in NRW
- Establishment of a competence cluster "Agro.NRW"
- Analysis of the potential of biobased products, processes and technologies in NRW
- NRW Stake-holder take part in the National Technology Council for Bio-Economy, founded by the Federal Republic of Germany in 2009

KBBE activities in **NRW-3**

- 1st NRW call (Bio.NRW, 2008/2009) – “Industrial Biotechnology” (25 Mill.€)
- Call “Food” (2008), 10 Mill.€
- Energy research programme (3 pillars; 3rd pillar: “Biological production of energy sources” with 3 elements:
 - Efficient crop cultivation to ensure the need of raw materials
 - Biorefineries – Production system of the 21st century
 - Knowledge-based bioeconomy

KBBE activities in **NRW-4**

- 2nd call Bio.NRW (09-2009) with a focus on red biotechnology
 - Development of new diagnostics and therapies for diseases with high societal and demographic impact, like i.e. cardiovascular and neurodegenerative diseases, cancer, diabetes
 - Analysis and diagnostics
 - Process development and production of new agents
 - New technologies
- Call “Forest and Forestry” being planned

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Thank you for your attention