

Holland Biotech Pavilion

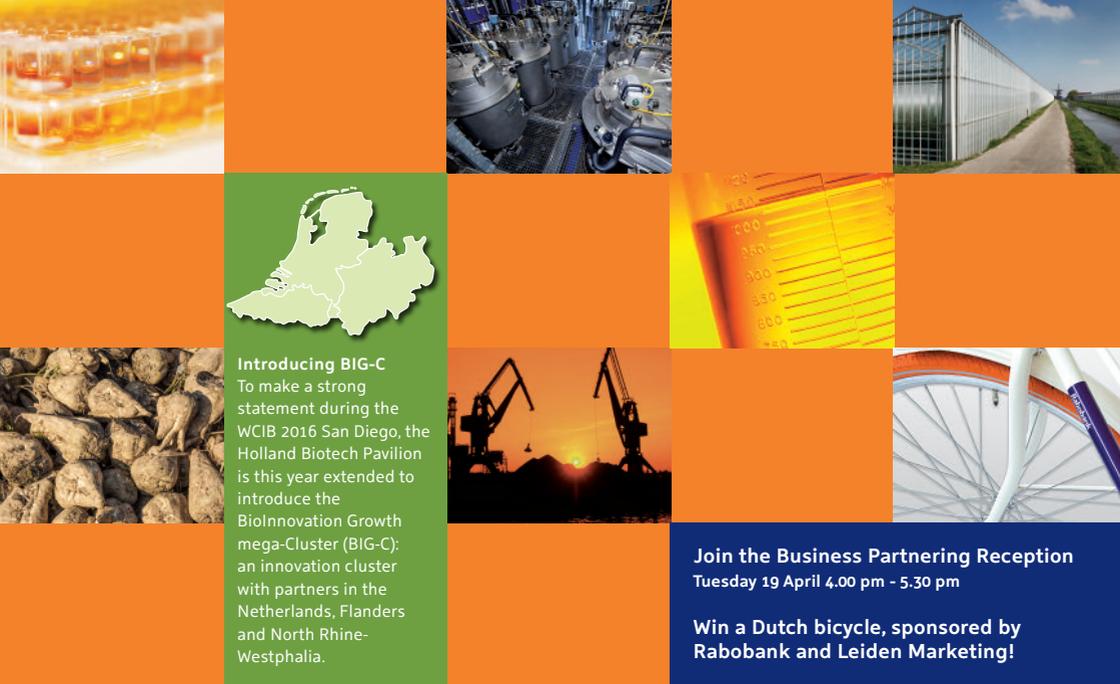
BIO World Congress on Industrial Biotechnology
San Diego, USA
17-20 April 2016



Introducing
BioInnovation
Growth mega-
Cluster (BIG-C)



Visit the Holland Biotech Pavilion at booth #307



Introducing BIG-C
To make a strong statement during the WCIB 2016 San Diego, the Holland Biotech Pavilion is this year extended to introduce the BioInnovation Growth mega-Cluster (BIG-C): an innovation cluster with partners in the Netherlands, Flanders and North Rhine-Westphalia.

Join the Business Partnering Reception
Tuesday 19 April 4.00 pm - 5.30 pm

Win a Dutch bicycle, sponsored by Rabobank and Leiden Marketing!

The Netherlands: leading player in the fields of biotechnology and biochemistry

The Netherlands is home to internationally renowned scientists with a strong reputation for knowledge and expertise in the fields of industrial biotechnology and biochemistry. Strong collaborations between the world-class academic and industrial sector, supported by the government, has led to ground breaking research and successful innovations.

Several locations in the Netherlands offer state-of-the-art lab space and offices, as well as open access, shared facilities with high-end lab equipment, ready for pilot and demonstration projects for companies and researchers who want to avoid the capital outlay for setting up their own facilities. It is also an ideal location for new production facilities as it provides excellent infrastructure and logistics.

The Holland Biotech Pavilion has been coordinated by BE-Basic Foundation: a leading international public-private partnership that develops industrial biobased solutions to build a sustainable society. BE-Basic Foundation initiates and stimulates collaborations between academia and industry, between scientists and entrepreneurs and between the Netherlands and abroad. www.be-basic.org.



Contents

Foreword: Welcome at the Holland Biotech Pavilion!	5
--	---

Company profiles

BE-Basic Foundation	6
Biobased Delta	7
Bioprocess Pilot Facility	8
Biorizon	9
Brightlands Chemelot Campus	10
Delft Advanced Biorenewables	11
Dutch DNA Biotech	12
Groningen Seaports	13
Innovation Quarter	14
NFIA	15
Photanol	16
Port of Rotterdam	17
Suiker Unie	18
Wageningen UR Food & Biobased Research	19
BIG-C BioInnovation Growth mega-Cluster	20
Introducing the Netherlands	22



 Holland.

Welcome at the Holland Biotech Pavilion!

Once again, we are present at the BIO World Congress on Industrial Biotechnology in San Diego. This year, we proudly present no fewer than 14 Dutch companies and organizations that represent outstanding expertise and know-how in the fields of biotechnology, biochemistry, energy, feedstock production, transport and logistics. The Netherlands' participation in this conference is yet another great example of the partnership that has existed between the Netherlands and the US for more than 400 years. Our economic partnership has created jobs, sound investments, and promising opportunities. The ties between our two countries keep growing stronger.

Dutch Expertise

Faced with the challenges of flooding and managing a lot of activity in a small country, the Netherlands has the expertise to solve many challenges the world faces today, including climate change, rising water, population growth, urbanization, and transportation. The Kingdom wants to reinforce economic prosperity for future generations, and constantly works to strengthen its powers of innovation and technology by promoting the knowledge economy and advances in biotechnology.

We believe in strong collaborations between businesses, universities, research institutes, and the government. This intense cooperation has led to ground-breaking research and successful innovations. Our state-of-the-art facilities have enabled the Netherlands to become a global center for industrial biotech collaboration and pilot projects.

Excellent Logistics

The Netherlands is a major hub for international business because of its strategic location, pro-business government, tax laws, and labor force. It is also the perfect gateway to Europe, thanks to excellent connections by road, air and water. Our sea ports are among the largest in the world. These ports are home to a wide range of suppliers and end-users of oil, gas, biomass and chemicals. Moreover, they give access to the European market, which has more than 350 million consumers.

BioInnovation Growth mega-Cluster (BIG-C)

To make a strong statement during the WCIB 2016 San Diego, the Holland Biotech Pavilion is introducing a partnership with the BioInnovation Growth mega-Cluster (BIG-C), which is the leading chemical mega cluster in Flanders, the Netherlands and North-Rhine Westphalia. Its goal is transition from a linear to a sustainable circular economy through smart specialization. BIG-C accelerates cross-border cooperation to create new value chains and increases the potential to attract opportunities and valorisation activities (demo plants) to the mega cluster.

New Opportunities

I am sure this congress will be as inspiring as previous years, allowing new successful international partnerships to grow. Let's explore the business possibilities to build an innovative biobased economy together. We invite you to visit the Holland Biotech Pavilion at booth 307 to explore the promising opportunities within these economic sectors.

Henne Schuwer

Ambassador of The Netherlands in USA





BE-Basic Foundation

Mijnbouwstraat 120
2628 RX Delft
The Netherlands
www.be-basic.org

Prof.dr.ir. Luuk A.M. van der Wielen

Distinguished Professor for Biobased
Economy, TU Delft (www.tudelft.nl)
Chairman of Executive Board of
BE-Basic Foundation

☎ +31 (0)15 278 2361 /-63 (secr)
✉ L.A.M.vanderWielen@tudelft.nl



Sandra Ransdorp

Executive Secretary

☎ +31 (0)15 278 9873
✉ A.M.Ransdorp@tudelft.nl



BE-Basic Foundation

BE-Basic Foundation is a leading international public-private partnership that develops industrial biobased solutions to build a sustainable society. BE-Basic stands for *Biotechnology based Ecologically BALanced Sustainable Industrial Consortium*.

To switch from fossil resources to biomass, new technologies and insights are required for all industries that provide us with food, chemicals, materials and energy. BE-Basic initiates and stimulates collaborations between academia and industry, between scientists and entrepreneurs and between the Netherlands and abroad to build a biobased economy together.

Our objectives

- To build a competitive, secure and sustainable biobased economy through industrial biotechnology that is less dependent on fossil resources, with a positive global climate effect.
- To monitor ecological stresses, and to control and improve local soil and water environments.
- To support societal embedding of products, services and processes of the biobased economy.

To reach our objectives, BE-Basic coordinates and stimulates RD&I programs for science and technology development, especially –but not exclusively- on environmental and industrial biotechnology. We focus on integral and sustainable biobased solutions, that balance and optimize economic value and climate impact for non-energetic (chemicals, materials, food&feed) and energetic (transportation fuels, power/heat) uses. Those balances are reached best by applying cascading and integral biorefinery concepts, and prioritise energetic uses for those sectors without alternatives (aviation, marine and heavy road transport).

Ready for the future

BE-Basic has come a long way in the 10 years of its existence, and has developed a clear idea about the feasibility of biobased solutions. The research conducted in the early years has shown how the technology works. The next stage would be implementing the technology and creating a support base for it in society. To do this, BE-Basic aims to bring players that represent science, the market and the government together. BE-Basic's next efforts will be geared towards exploring how its technical expertise, combined with its knowledge of society, can help pave the way for a biobased economy.

BE-Basic coordinates the Holland Biotech Pavilion at the BIO World Congress on Industrial Biotechnology 2016 in San Diego.

Biobased Delta

Plasticslaan 1
4612 PX Bergen op Zoom
The Netherlands
www.biobaseddelta.nl

Willem Sederel

Member of the Board Biobased Delta-
International Affairs

☎ +31 (0)6 46 88 11 30
✉ willem.sederel@biobaseddelta.nl



Biobased Delta

Agro and chemistry meet within a radius of 60 km in the Biobased Delta, a region in the South-western Netherlands. Collaboration between and integration of technologically advanced farmers, the presence of agro & food companies, large chemical players, the presence of brand owners, a large number of innovative SMEs, renowned knowledge institutions, educational institutions, pilot and demonstration plants, and supporting governments: together they form the innovation eco system of Biobased Delta.

Triple Helix

Building on a Triple Helix, the Biobased Delta has set a comprehensive structure that supports the acceleration of innovation, development and further growth of the biobased economy in the region. SMEs act as a catalyst for interaction between the involved actors. The governing board of the Biobased Delta consists for the greater part of business people, supplemented by people representing research, educational, advocacy and governmental parties. Together they have set and are executing an ambitious agenda for the next decades. The ecosystem of the Biobased Delta will allow for successful integration and new value chains, implying an acceleration of biobased business.

Europe's sweet spot

With the abolishment of Europe's sugar quota in 2017 new market opportunities to extract biobased chemicals from sugars have arrived. The Biobased Delta has a competitive feedstock and cost position for sugars. With the fast growing fermentation business, Biobased Delta is on its way to become Europe's chemical 'sweet spot'.



BIOPROCESS
PILOT FACILITY

Bioprocess Pilot Facility

Postbus 198
2600 AD Delft
The Netherlands
www.bpf.eu

Peter Flippo

Director BPF

M +31 (0)6 1211 8786
E peter.flippo@bpf.eu



Arno van de Kant

Business Development Manager BPF

M +31 (0)6 42 48 07 54
E arno.kant-van-de@bpf.eu



Bioprocess Pilot Facility

Situated at the Biotech Campus Delft, the Netherlands, the Bioprocess Pilot Facility B.V. (BPF) is a unique open access facility. Companies and knowledge institutions can develop new sustainable production processes by converting bio-based residues into useful chemicals or fuels and production processes for Food and Pharma.

The facility has been specifically designed to enable the transition from laboratory to industrial scale. The facility has a modular setup. BPF allows users to construct complex operations by linking the separate process modules: Pretreatment, Hydrolysis, Fermentation and/or Downstream Processing.

About 30 people, mainly experienced process operators are working at the BPF.

Biobased scale up expertise:

BPF is a service provider with very flexible facilities to help our customers to scale up their process. We have experience with many different chemicals, food and pharma ingredients of which many cannot be disclosed because of confidentiality. Known examples are ethanol, lactic acid, DDDA and 7-ADCA.

Because of its high quality standards, the BPF can also be used to produce kg-quantities of material for pre-marketing and application tests at customers and/or preclinical trials (for Food or Pharma applications). The BPF has a long standing historical track record in bioprocess piloting with an experienced crew.

Facilities

We have 4 different pilot plants which can interact:

- **Pretreatment** (biomass, also lignocellulosic) on benchscale and pilot scale.
- **Fermentation** from 10l up to 8m³. (ATEX, GMO)
- **Downstream processing**, chemical processing (ATEX)
- **Food grade** with fermentation and DSP.

All product streams can be connected, to mimic a downscaled process of a commercial plant. The scaling up of the lab process can then be proven on pilot scale with a good prediction of the process on commercial scale.

Biorizon

Plasticslaan 1
4612 PX Bergen op Zoom
The Netherlands
www.biorizon.eu

Ing. Joop Groen MBA

Business Development Manager

T +31 (0)6 51 91 80 96
E joop.groen@tno.nl



Prof. Dr. Ludo Diels

Scientific Manager

T +32 (0)477 622 304
E Ludo.diels@vito.be



Biorizon >> The Way to Aromatics

Shared Research Center Biorizon, an initiative of TNO, VITO and the Green Chemistry Campus, develops technologies to produce aromatics derived from plant-based waste streams. Biorizon is including global leaders in the fields of feedstock, conversion, equipment and end-products as participants, as well as SME companies. Biorizon aims to be a world leader in the development of biobased aromatics within five years, and to make commercial production feasible for industrial partners by 2025.

Market Demand to Green the Chemical Industry

Aromatics are among the most important resources for the chemical industry. Currently virtually all aromatic building blocks are made from fossil oil. Biorizon is anticipating the expected growing shortage of aromatics from the petrochemical industry and the widely shared ambition to green the chemical industry.

Biorizon utilizes plant-based waste streams such as lignin and sugars to develop functionalized biobased aromatics for performance materials, chemicals & coatings. This diminishes the dependence on fossil fuel, it lowers CO₂-emissions and it provides the chemical industry a profitable and sustainable perspective.

Industry Driven Shared Research Center

Biorizon is operated as a Shared Research Center, based on the open innovation methodology, bringing together collective intelligence of various industries, companies and knowledge organizations. The multi-disciplined technological need, as well as our long term roadmap make this effort suitable for shared research, sharing intelligence, investments, risks and workload.

Biorizon is a cross-border initiative between TNO, VITO and the Green Chemistry Campus and is part of Biobased Delta. Biorizon is located at the Green Chemistry Campus in The Netherlands, at the heart of industries between Antwerp and Rotterdam.

Join Biorizon's Community on Biobased Aromatics

For partners and companies that consider joining our Shared Research Center we've created a community that provides excellent networking opportunities and information on current developments. Please join at: www.biorizon.eu/community

Brightlands Chemelot Campus

Urmonderbaan 22
6167 RD Geleen
The Netherlands
www.brightlands.com

Bart van As

Business Development Manager
Biobased

☎ +31 (0)6 19273846
✉ bart.vanas@brightlands.com



Brightlands Chemelot Campus

Brightlands Chemelot Campus is the world's hotspot in polymeric materials, from raw materials (building blocks) to processing and products. Research and development take place at Brightlands Chemelot Campus and education is given in the fields of chemistry and materials, and the related life sciences. The focus is on high-quality materials, biomedical materials, and bio-based materials. The future of polymeric materials lies for a large part in sustainable value chains, where renewable raw materials, recycling and the use of biomass are important drivers. Brightlands Chemelot Campus ambition is to be the major player in Western Europe in this arena. Brightlands Chemelot Campus is developing into a creative breeding ground for innovation and for new companies with thousands of highly trained employees. This dynamic situation is the result in part of collaboration among the business community, education and knowledge institutes, and the government. The campus makes an active contribution through activities such as facilitating the construction of pilot plants and the acceleration of new business development.

The Brightlands Innovation Factory is the entrepreneurial backbone of Brightlands Chemelot Campus, supporting start-up companies in every phase. Brightlands Innovation Factory empowers today's pioneers in advanced materials on their journey from a bold idea to a legendary company. World-class industry knowledge and expertise are coupled with mentor-supported programs, value-added services and facilities, and access to funding.

Brightlands Chemelot Campus has recently opened a multipurpose piloting facility for the thermochemical and chemochemical conversion of (biobased) building blocks on a 500 kg/day scale. These facilities fulfil an important requirement for companies to scale up processes from lab scale to pilot scale and to initiate pilot production, in order to reduce capital and risk in scaling up to demo scale and full scale production. This multipurpose pilot facility will employ the newest technologies through the collaboration with Eindhoven University of Technology, Maastricht University and DSM as founding fathers of the Chemelot InSciTe public-private knowledge institute on biobased chemistry. Chemelot InSciTe will be the main user of these pilot facilities for its own RT&D program on biobased building blocks and materials, and the remaining capacity is available for third parties on a commercial basis.

For more information, visit: www.brightlands.com

**Delft Advanced
Biorenewables**

TUD gebouw 5
Julianalaan 67
2628 BC Delft
The Netherlands
www.DelftAB.com

**Dr. ir. Kirsten Herben-
Steinbusch**

Managing director

T +31 (0)6 55118744
E Steinbusch@DelftAB.com



Delft Advanced Biorenewables (DAB)

DAB B.V. is a science based company developing bioprocess engineering solutions for health, nutrition, materials and advanced biobased markets. DAB's team has over 75 years of experience in industrial fermentation and downstream processing to develop and intensify bioconversion systems to our client's specifications and demonstrate technological solutions at relevant scale.

DAB offers tailor made recovery technologies that can be well integrated into existing or new facilities. With our innovate proprietary reactor concept, we overcome emulsion formation during fermentations of oily products. We are able to increase product recovery without the addition of chemicals nor the use of complex and expensive process steps.

DAB's expert team can serve her clients and partners with quantitative fermentations up to 100 liter scale and can support with a wide range of recovery methods and analyses. In addition to lab scale fermenters, our experts have access to a next-door bioprocess pilot facility to upscale different technologies and fermentations up to 8 m³ volume.

For more information visit our stand. Our managing director Kirsten Steinbusch is willing to answer your questions or requests at the congress or contact us via info@delftab.com.

Dutch DNA Biotech BV

P.O. Box 360
3700 AJ Zeist
The Netherlands
www.ddna-biotech.com

Prof. Dr. Peter Punt

✉ Peter.punt@ddna-biotech.com

**Cornelis Mijnders**

Sales Manager Energy

☎ +31 (0)6 46847311
✉ Cornelis.mijnders@ddna-biotech.com

**Dutch DNA Biotech BV**

Dutch DNA Biotech is a management buyout from TNO, which continues the R&D activities on biotechnology. TNO, the Dutch National Research and Technology Organisation, developed this world leading position in Fungal Biotechnology since the late eighties. Our company, Dutch DNA Biotech, applies and commercializes its knowhow base in several ways. Our mission is: creating new business by the introduction of revolutionary biotechnology in industrial markets. We believe in a new industrial era in which sustainable products and production methods will replace those of the last century.

We have a culture collection in house of several fungal systems like Aspergilli, own several patents and trade secrets (e.g. a method to select for low protease strains). Our facilities in the Netherlands: 350+ m² lab (MLII) including small scale fermentation.

Research areas

Our core competence is genetically modifying fungal production hosts and optimizing fermentation processes. We are active in two areas: enzymes and organic acids. In both we have a significant patent portfolio and we work together with both academic, industrial and financial partners. The shorter the time to market, the more we co-operate with industrial players. The longer the time to market and/or the more disruptive the end products, the more we work with academic and financial partners.

To keep close connection to fundamental research Dutch DNA Biotech funds a chair at the University of Leiden and contributes to different research programs of academic consortia. The experienced crew delivers to a number of clients and partners high level R&D solutions for enzyme/protein expression in fungi or production hosts for compounds.

Groningen Seaports

Handelskade Oost 1
9934 AR Delfzijl
The Netherlands
www.groningen-seaports.com

Henri Kats

business manager chemicals

T + 31 (0)6 46304274
E h.kats@groningen-seaports.com



Chemport Delfzijl

The biobased location of Northwest Europe

Economic growth = green

By 2030, the Eemsdelta will be the most important green seaport and industrial region of the northern Netherlands. The chemicals and recycling industry in Delfzijl is fully bio-based. Thanks to the strong connection between energy and agribusiness in Eemshaven and the bio-based chemicals and recycling cluster in Delfzijl, a single efficient and competitive green seaport complex has been formed. Government bodies, the corporate sector, knowledge institutes and social organisations all work closely together, which enables the corporate sector and knowledge institutes to adequately meet the demand for know-how, technology and manpower. Together with the excellent accessibility, quality of the living environment and location at the Wadden Sea world heritage site, this makes the Eemsdelta an extremely attractive spot for (new) companies and (new) inhabitants alike.

Chemport Delfzijl

Chemport Delfzijl is salt and chlorine related with specialty and performance chemical companies on site and is an example of chemical industries exploiting local reserves. The region is rich in natural gas and salt. Bordering on the North Sea / Eems Estuary dykes, Chemport Delfzijl has direct access to sea, inland shipping, the motorway infrastructure of Northwest Europe, and railroad. The chemical industry in Delfzijl accounts for no less than 15% of all chemical products manufactured in the Netherlands. Chemport Delfzijl is a unique collaborative effort between companies in which raw materials are exchanged, facilities are shared and attention is paid to safety, quality, people and the environment.

Groningen Seaports

Chemport Delfzijl is managed by Groningen Seaports, which is the port authority for the port of Delfzijl, Eemshaven and the adjoining industrial sites. The organisation provides the complete package of port services to its industrial and commercial clients, from logistics and infrastructure services to the issue and maintenance of the sites in both port regions.



InnovationQuarter

WTC The Hague
Prinses Margrietplantsoen 32
2595 BR The Hague
The Netherlands
www.innovationquarter.eu

Loek Becker Hoff

Senior Account Manager Cleantech

T +31 (0)88 4747 255

M +31 (0)6 12226907

E [loek.beckerhoff@](mailto:loek.beckerhoff@innovationquarter.nl)

innovationquarter.nl



InnovationQuarter

InnovationQuarter is the regional development agency for West Holland. InnovationQuarter finances innovative and fast-growing companies, assists foreign companies in establishing their businesses in West Holland, and organizes collaboration between innovative entrepreneurs, knowledge institutes and government. In this way, and in cooperation with the business community, InnovationQuarter supports the development of West Holland to become one of the most innovative regions in Europe.

InnovationQuarter has a dedicated, inward promotion team in place to facilitate you in finding the right locations and facilities for setting-up or expanding your business in West Holland. We help you with our services, know-how and networks.

- Detailed information – we provide you with the information you need regarding the Dutch business climate, such as labor market, taxation, real estate, incentives.
- Extensive networks – we facilitate introductions to our extensive networks, which include both the private and public sector.
- Site selection – we facilitate and organize your fact finding trip on the ground, arrange customised meetings and personally guide you through the procedures of setting-up your business and the complete site selection process.
- R&D matchmaking services – we help facilitate connections to collaboration partners, research institutes, test facilities, or companies.
- Investor relations - we continue to support you as your business moves through all phases of growth, expansion or relocation.

InnovationQuarter is an initiative of the Ministry of Economic Affairs, the Province of South Holland, the Cities of Rotterdam, The Hague, Leiden, Delft, Westland, Zoetermeer and Drechtsteden, Delft University of Technology, Leiden University, the Leiden University Medical Center and Erasmus Medical Centre.

Netherlands Foreign Investment Agency (NFIA)

Prinses Beatrixlaan 2
2595 AL The Hague
The Netherlands
www.nfia.nl

Rein Coster

Director Chemicals NFIA

T +31 (0)70 337 87 18
M +31 (0)6 43 85 24 91
E coster@vnci.nl



NFIA Office San Francisco

One Montgomery Tower
120 Kearny Street, Suite 3100
San Francisco, CA 94108
www.investinholland.com

John van den Heuvel

Director Northwest USA

T 1 (415) 291 2060
M 650-575-7786
E john@nfia.com



Netherlands Foreign Investment Agency (NFIA)

For foreign companies wishing to establish their business in the Netherlands and to take advantage of the Dutch business environment as a strategic base to cover Europe, the Netherlands Foreign Investment Agency (NFIA) is the first port of call.

The NFIA was established for the specific purpose of helping and advising such companies by providing them with advice, information and practical assistance, quickly and on a confidential basis, as well as providing them access to a broad network of business partners and government institutions, all free of charge.

Founded 35 years ago, the NFIA is an operational unit of the Dutch Ministry of Economic Affairs. Throughout the years it has supported thousands of companies from all over the world to successfully establish their business in the Netherlands.

NFIA support starts in the country of origin. To that end, the NFIA has offices in Europe (HQ in The Hague, London, Istanbul), the US (New York, Boston, Chicago, Atlanta, San Francisco), Asia (Tokyo, Osaka, Taipei, Shanghai, Beijing, Guangzhou, Seoul, Delhi, Mumbai, Singapore and Kuala Lumpur), the Middle East (Dubai, Tel Aviv) and Brazil (São Paulo). In addition, the NFIA closely cooperates with Dutch embassies, consulates-general and other organizations that represent the Dutch government around the world.

The Netherlands is a leading player in the international industrial biotechnology and biochemistry industry and home to internationally renowned scientists and companies in this field. Thanks to the proximity of the Port of Rotterdam, Europe's largest sea port, the area offers excellent international logistical access, a high density of suppliers and end-users in the surrounding industrial zone. This, combined with abundant availability of feedstock, enables efficient industrial biotech production.

Photanol

Science Park 408
1098 XH Amsterdam
The Netherlands
www.photanol.com

Veronique de Bruijn

Director

T +31 (0)6 1904 7030
E Veronique.debruijn@photanol.com



Peter van Gelderen

Supervisory board member Photanol &
Founding partner Icos Capital

T +31 (0)6 2822 9932
E pvg@icoscapital.com



Photanol

Photanol have developed a 4th generation biochemicals technology that is the most efficient bio-based production method to convert carbon dioxide directly into valuable organic chemicals such as biofuels, bioplastics building blocks, essential oils and many others.



The Photanol concept uses customisable cell factories: engineered cyanobacteria that turn carbon dioxide directly into predetermined products in the most efficiently process possible. Our microbiologists engineer these bacteria by introducing properties (genes/enzymes) of other organisms (such as fermentative bacteria, yeasts and plants) to have them produce and excrete valuable compounds by design. They now divert their energy from growing and multiplying toward making the desired product in a very efficient way.

Our platform offers our partners a way to avoid dependence on fossil resources, to avoid using crops, to obtain a more economically attractive route to an existing product or to get access to new products.

Photanol has proof of concept on a wide range of products and operates a pilot plant to prove reliable production under relevant conditions.

Port of Rotterdam

Port of Rotterdam
World Port Center
Postbus 6622
3002 AP Rotterdam
The Netherlands
www.futureland.nl
www.maasvlakte2.com
www.portofrotterdam.com

Stijn Effting

Business Manager Bio Based &
Chemical Industry

T +31 (0)10 252 1874
M +31 (0)6 2252 5273
E SHJ.Effting@portofrotterdam.com



Port of Rotterdam.

Open a world of opportunities.

Make it happen.

Port of Rotterdam owes much of its success to the pioneering spirit of previous generations of workers, entrepreneurs and innovators. It's that same pioneering spirit that ensures you stay ahead, well into the future.

Doing business in Rotterdam offers you all the advantages of doing business with a world leading port that offers the best port facilities, services and infrastructure available. Port of Rotterdam has a major natural advantage. Europe's largest deep sea port is situated at just the right place: at the mouth of two of the continent's major rivers right next to Europe's busiest sea lane. This makes Rotterdam the fastest option and natural port of choice for trade flowing to and from Europe.

Port of Rotterdam is Europe's best connected gateway and hub. Connected to over 1.000 ports worldwide and to Europe's most extensive and elaborate network of rail, road, short sea, barge connections and pipelines. This brings all major European industrial clusters, and a market of 500 million consumers within 24 hours reach. In Rotterdam we see no limits to your ambition. Choosing for Rotterdam, is choosing to stay ahead.

Suiker Unie

Suiker Unie Central Office
P.O. Box 100
NL 4750 AC Oud Gastel
The Netherlands
www.suikerunie.com

Erik van Hellemond

Project Leader Biobased Technology

M +31 (0)165 525 088
E erik.van.hellemond@suikerunie.com
suikerunie.com



Frank van Noord

Director Research and Development

M +31 (0)165 525 179
E frank.van.noord@suikerunie.com



Suiker Unie

Suiker Unie develops, produces and markets sugar and sugar specialties. Her factories for the production of sugar in Dinteloord, Vierverlaten and Anklam (Germany) are among the most modern in the world. Suiker Unie forms part of Royal Cosun. This international group develops, produces and markets natural foodstuffs and food ingredients. Royal Cosun is a cooperative of approximately 10,000 sugar beet growers. The group has an annual turnover of approximately EUR 2.1 billion and has more than 4,000 employees.

Suiker Unie's mission is to be the best at maximising the value and sustainability of all components of the sugar beet for its customers, growers and staff. Being one of the largest suppliers of biomass in The Netherlands, Suiker Unie is strongly investing in the biobased economy by working on bioplastics produced from thick juice, fibres from beet pulp and proteins from sugar beet leaves.

Recently Suiker Unie has built large scale biomass digesters adjacent to all its sugar plants. These digesters ferment more than 100,000 tonnes of vegetable residuals each every year into green gas. Most will come from our own production processes but suitable residual flows, such as potato peelings, chicory pulp and vegetable cuttings, will also be sourced from other businesses. At full capacity, Suiker Unie's three digesters will produce more than 25 million m³ of green gas per year and feed it into the regional grids.

Suiker Unie is developing its production plants into world class biorefineries. The "Nieuw Prinsenland" Cluster near the Dinteloord site includes a business park and a greenhouse complex. It is based on the principles of cooperation and the exchange of products and residual flows: biomass, heat, water and CO₂. In Vierverlaten a similar site is being developed near the sugar factory: "Biobased Park WestPoort".

Wageningen UR Food & Biobased Research

P.O. Box 17
6700 AA Wageningen
The Netherlands
www.wageningenUR.nl/fbr

Prof Dr Jeroen Hugenholtz

Business Development/
Senior Scientist Bioconversion

T +31 (0)317 485287
E jeroen.hugenholtz@wur.nl



Wageningen University and Research Centre (WUR)

Wageningen University and Research Centre (WUR) is a leading international education and research organization that contributes significantly to the quality of life in the fields of food and health, sustainable agro systems, inhabitable green space and social changes. The research institutes belonging to the department Food & Biobased Research (WUR-FBR) provide applied research to enable the rapid conversion of fundamental knowledge to applications on the market. WUR-FBR is represented in the Holland Pavilion by the business unit Biobased Products. Researchers at WUR-FBR develop insights and technologies that support industries, governments and consumers in the creation and production of healthy and tasty foods, of truly-sustainable food chains and in developing chemicals and materials that use biomass instead of fossil resources.

For presentation in the Holland Pavilion, WUR-FBR has selected a couple of examples of biobased solutions for food and non-food applications. In the Food Area, we offer solutions in development and production of natural, biobased, antifungals from both plant and microbial sources, we demonstrate efficient production processes of (micro)Algae as source of food ingredients, and we show rapid and sensitive diagnostic methods to identify and quantify positive or negative health components in food. In the Non-Food Area we describe unique sources and efficient extraction or production processes of alternative, natural, rubbers such as guayule, Russian dandelion and various microorganisms, we demonstrate how waste streams of local agricultural and municipal waste/biomass can be converted into jetfuel by the use of ABE-fermentation, we provide a sustainable, microbial, production process of various fatty acids that are relevant for the chemical industry, using reversed beta-oxidation, and we demonstrate various strategies to produce high value components from recalcitrant, and abundant, biomass such as lignin and chitin.

BIG-C

*strongly urbanised
and industrialised*



Leading chemical mega cluster in Flanders, The Netherlands and North-Rhine Westphalia

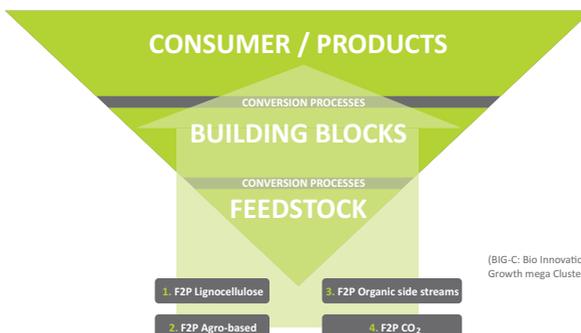
What: Transition from a linear to a **sustainable circular economy** through Smart Specialisation

By: BIG-C accelerates cross border cooperation to create new value chains and increases the potential to attract opportunities and valorisation activities (demo plants) to the mega cluster

Why: The mega cluster has an excellent position in:

- Industrial value chains including SME's
- Infrastructure and logistics
- Human capacity
- Research and development (universities and institutions)
- Well-functioning (public-private) partnerships

How: Create circular value chains from **feedstock to product** (F2P) and leverage to synergy:



(BIG-C: Bio Innovation Growth mega Cluster)

KU LEUVEN

KU Leuven

Bert Lagrain, PhD
*Industrial Research Manager,
Centre for Surface Chemistry and Catalysis*

T +32 (0) 16 32 16 27
E bert.lagrain@biw.kuleuven.be
I www.biw.kuleuven.be/m2s/cok/



VITO, Flemish Institute for Technological Research

Heleen De Wever
Project Manager Biotechnology

T +32 (0) 14 33 69 32
E heleen.deweever@vito.be
sustainablechemistry@vito.be
I www.vito.be



Phytowelt GreenTechnologies GmbH

Dr. Peter Welters
CEO

T +49 (0) 2162 77859
E contact@phytowelt.com
I www.phytowelt.com



Insilico Biotechnology AG

Dirk Rathfelder (Dipl.-Biol.)
Head of Business Development

T +49 (0) 711 460 594-19
M +49 (0) 1579-2343785
E dirk.rathfelder@insilico-biotechnology.com
I www.insilico-biotechnology.com



c-LEcta GmbH

Dr. Andreas Buthe
Senior Business Development Manager

T +49 (0) 341 355 214-16
E andreas.buthe@c-LEcta.com
I www.c-LEcta.com



BE-Basic Foundation

Prof.dr.ir. Luuk A.M. van der Wielen
BE-Basic Foundation / TU Delft

T +31 (0) 15 278 2361 /-63 (secr.)
E L.A.M.vanderWielen@tudelft.nl
I www.be-basic.org

Introducing the Netherlands



Source: Rijkswaterstaat

A country that the Dutch created in the delta of three large rivers, flowing into the North Sea... Where two thirds of GDP are earned below sea level... Where there used to be a lake almost two million acres wide where Amsterdam Airport Schiphol is today... Where innovative and daring solutions for water control protect half of the country against the risk of being flooded. It earned us a worldwide reputation... **We know water.**

A country that was in need of more land for agriculture... Where land was reclaimed from the sea and kept dry: the famous 'polders'. A country supposedly too cold to grow certain vegetables and flowers... Where greenhouses were invented as a solution to this problem. Where Dutch farmers now produce 2.5 times more food per acre than EU farmers produce on average...

We know food & flowers.



Source: Tomato World



Source: Europe Container Terminals BV, Rotterdam

A country that is the gateway to Europe... Connecting nearly half a billion consumers in the European hinterland to the world's producers... Thanks to the world-class Port of Rotterdam, the internationally praised Amsterdam Airport Schiphol, an extensive network of waterways, Europe's strongest road transport sector and an extensive network of rail links **We know logistics.**

A country with an open and cooperative attitude... Whose residents have always felt the need to explore what lies beyond its borders... Where the world's first multinational corporation originated in the 17th century. A country where, today, more than 80% of people who are 15 years or older speak English...

We know international business.



Source: Hans Kouwenhoven

Worldwide ranking

- **1st** Production and auctioning of cut flowers and flower bulbs
- **2nd** Number of broadband connections per 100 inhabitants (39.4%)
- **2nd** Density of road network
- **2nd** Export of agricultural products (103.3 billion US Dollar)
- **2nd** Quality of Water Transportation (9.04)
- **2nd** Logistics performance Index (4.05)
- **4th** Largest seaport in the world (Port of Rotterdam), largest in Europe
- **6th** Exporter of goods (555 billion US Dollar)
- **7th** Foreign direct investment in the Netherlands (From Europe)
- **8th** Import of commercial services (119 billion US Dollar)
- **9th** Dutch investments abroad (976 billion US Dollar)
- **9th** Importer of goods (501 billion US Dollar)
- **9th** Export of commercial services (134 billion US Dollar)

Facts & figures

- **Form of government** Parliamentary democracy, constitutional monarchy
- **Capital city** Amsterdam
- **Seat of the government** The Hague
- **Composition of the country** Twelve provinces, overseas territories of Aruba, Curaçao and St. Martin. The overseas islands of Boanire, Saba and St. Eustatius, all three of which are situated in the Caribbean, are 'special municipalities of the Netherlands'
- **Language** Dutch, Frisian
- **Monetary unit** Euro
- **Population** 116,848,640 (May 2014)
- **GDP in the EU** 615.4 billion Euro (2014)
- **GDP per capita** 43,146 US Dollar (2012)
- **Trading partners** 1) Germany; 2) Belgium; 3) UK; 4) France;
- **Import partners** 1) Germany; 2) Belgium; 3) China;
- **Dutch investments abroad** 777.2 billion Euro (Ultimo 2013)
- **Foreign direct investment in the Netherlands** 485.9 billion Euro (Ultimo 2013)
- **Command of foreign languages** English (80% of > 15 years old), German (66%) and French (25%)

Knowledge is power. Sharing knowledge is more powerful. Doing business the Dutch way is doing business with you and for you! It's not about quick fixes or easy money, but about cooperation and consideration of individual needs of partners... Trade is in our DNA.

Energy Sector

Holland innovates in renewable energy

The Netherlands has embraced a courageous vision: by 2050, the country will have a sustainable, reliable and affordable energy system. To achieve this, the Dutch aim to cut CO2 emissions by half to generate some 40 percent of its electricity from sustainable sources like wind at sea and biomass by that time. Carbon emissions will be reduced by increasing the portion of renewable energy, energy saving, nuclear energy and Carbon Capture and Storage.

By 2020, the European Renewable Energy Directive sets the target of 14% renewable energy. Renewable resources will play an important role in the bio based economy.

To stimulate renewable energy production, the government has earmarked an annual sum of € 1.4 billion from 2015, which represents a major step towards achieving the 2020 target.

Innovation and public private partnerships are key to the Dutch approach: the government, private sector, and academia co-operate on the following priority topics: energy savings in industry and the built environment, gas, smart grids, wind at sea, solar energy and bio energy.

The Netherlands is experimenting with energy from waves, algae and biomass and the Dutch have developed innovative solutions in decentralised energy production in greenhouses, CO2 'recycling' and waste heat utilisation for their energy intensive horticulture industry. As a result, compared to other countries, the proportion of installed decentralized capacity in the Netherlands is very high. In addition, the Dutch are investing heavily in Smart Grids, which facilitate developments such as electric vehicles. In fact, the city of Groningen has the first 'live' smart grid community in Europe: PowerMatching City.



Photo: Flying Focus

Websites

www.cleantechholland.nl - Dutch export platform for Dutch clean tech companies

www.dekoepel.org - Dutch Renewable Energy Association (Dutch language)

www.energiened.nl - Association of Energy Producers, Traders and Retailers (Dutch language)

www.vlm.fme.nl - Association of Suppliers of Environmental Equipment and Technology

www.ecn.nl - Energy Research Centre of the Netherlands

www.biobasedeconomy.nl - Networking platform for government, companies, scientists and NGOs

Key aspects and strengths

- Renowned institutes such as the Groningen Energy Delta Institute train people from all across the globe. In addition, the Netherlands is establishing itself as leader in green gas.
- With its location at the heart of Europe and the logistical, petrochemical and industrial centre around the Port of Rotterdam, the Netherlands aims to become Europe's bio fuel hub.
- There is extensive experience in the field of energy efficiency due to a long tradition of multiannual voluntary agreements on energy efficiency between Dutch industry and the government. This has made Dutch industry one of the most energy efficient in the world.
- The Dutch have leading expertise in offshore wind energy, co-combustion of biomass in coal-fired power plants, pre-treatment methods of biomass, the use of landfill gas, and the use of heat pumps combined with heat and cold storage.
- The Netherlands has an international reputation for research in renewable energy, due, in part, to the work of the energy research centre ECN.

Facts & Figures

- The Netherlands is a major natural gas producer and the source of advanced gas technology. It is also Europe's leading gas broker and a strategic gas hub. The country produced 80.2 billion cubic metre (bcm) in 2012. Gas exports amounted 60.4 bcm.
- The distribution network for gas is the densest in Europe with a total length of 12,200 kilometres of transmission pipelines and 136,400 kilometres of distribution pipelines.
- The Dutch have unmatched capacity to cope with seasonal fluctuations in gas demand, providing north-western Europe with much-needed flexibility.
- The Delft University of Technology has won the World Solar Challenge, the biennial competition for solar cars, in 2001, 2003, 2005, 2007 and 2013.
- The Dutch have leading expertise in offshore wind energy, co-combustion of biomass in coal-fired power plants, pre-treatment methods of biomass, the use of landfill gas, and the use of heat pumps combined with heat and cold storage.
- There is extensive experience in energy efficiency due to a long tradition of multi-annual voluntary agreements on energy efficiency between Dutch industry and the government. This has made Dutch industry one of the most energy efficient in the world.
- 7.5 million tons of municipal waste is converted in 13 efficient and clean waste incinerators to power, heat and reusable resources from the ashes.
- 'Green gas' technology, the gasification of biomass, has been patented by Dutch energy company ECN. Studies indicate that 'green gas' can replace 10% of Dutch-consumed natural gas by 2020.
- Holland plays a key role as a major oil refining centre in Europe, with an extensive supply network of ports, storage facilities and pipeline connections playing a critical role for oil supplies to the continent. The country is among the largest traders of crude oil and petroleum products in the world.





Photo: Dow

Chemical Sector

Holland: your chemical portal to Europe

The chemical industry in the Netherlands, a priority sector of the Dutch government, is strongly focused on sustainability. The chemical industry has therefore agreed on a long-term strategy aimed at increasing productivity, doubling both turnover as well as CO₂ reductions and reducing the environmental footprint. Goal is to be known as the Green Chemistry Country and to be ranked among the top three producers of high-tech materials worldwide by 2050.

The whole chemical supply chain is represented in the Netherlands through its internationally operating world-class companies in each segment. Dutch chemical companies work together in public-private partnerships on innovation and production, and take advantage of regional clustering. Because of its integrated nature, Holland now hosts 19 of the world's top 25 leading chemical companies such as LyondellBasell, Sabic, Teijin and Dow, as well as a number of world class R&D institutes for fundamental and applied research.

Websites

www.vnci.nl - Netherlands Chemical Industry Association

www.kncv.nl - The Royal Netherlands Chemical Society

www.be-basic.org - Bio-based, Ecologically Balanced Sustainable Industrial Chemistry

www.ispt.nl - Institute for Sustainable Process Technology

www.polymers.nl - Dutch Polymer Institute

www.m2i.nl - Materials Innovation Institute

www.iro.nl - The Association of Dutch Suppliers in the Oil and Gas Industry

www.nfia.nl/chemical_portal_to_europe.html - Holland: your chemical portal to Europe

Key aspects and strengths

- Holland enjoys an excellent geographical location and infrastructure and knows how to leverage location and infrastructure to ship chemicals quickly and economically to any destination in the world. It operates Europe's largest inland shipping fleet and has an extensive network of roads, railways, and pipelines. Holland is also home to one of Europe's best cargo airports (Schiphol), and Europe's largest sea port (Rotterdam). The Dutch have world-leading expertise in logistics and supply chain management.
- The competitiveness of the Dutch chemical industry lies in its internal and inter-company integration. Chemical companies purchase from – and supply to – one another.
- Within the strong chemical community, the Dutch have formalized and structured the approach to co-operation. This is done with formal, long-term public-private partnerships (such as BE-Basic, the Institute for Sustainable Process Technology and the Dutch Polymer Institute) as well as through 'open innovation' in so called Centres for Open Chemical Innovation (COCI). The five COCIs are Chemelot, the Green Chemistry Campus, Biotech Campus, Plant One, and Green Polymer Application Valley
- The Dutch chemical industry excels in three sustainable areas: 1) the industrial biotechnology cluster combines world-class knowledge on agro-food and chemistry with cross-disciplinary co-operation and innovation. 2) Dutch excellence in high-performance materials (3) and fine chemistry.
- In the area of advanced materials (polymers, composites, etc), the Netherlands consistently punches above its weight, producing world-renowned innovations in materials such as Twaron, Dyneema and Glare, as well as the folding tires for the automotive industry.

Sources: VNCI, NFIA

Facts & Figures

- The chemical industry is one of the leading business sectors in the Netherlands, making a significant contribution to the economy. In 2013, the turnover was 57 billion euros.
- The Netherlands is the world's 5th ranking chemical exporting country. In 2013, Dutch chemical exports were valued at some 75 billion euros.
- About 80% of chemical products made in Holland are exported. A fifth of all Dutch exported goods come from the chemical sector.
- The chemical industry made a positive contribution of almost €60 billion to the balance of trade in 2012, which was over 60% of the total balance of trade of commodities of the Netherlands.
- Innovation is essential – the Dutch chemical industry devotes about 2.5% of its revenues to in-house R&D, some €1.4 billion per year.
- The Netherlands hosts 16 of the world's top 25 leading chemical companies, including BASF, AkzoNobel and Shell.
- Holland is home to world-class R&D institutes for fundamental and applied research such as TNO, Delft University, Twente University, Wageningen University and Eindhoven University.





www.be-basic.org/wcib2016.html

coordinated by BE-Basic Foundation

www.hollandtrade.com

