# Green Chemistry Campus

Welcome to our Friends from Finland

D. van der Pas Green Chemistry Campus











Accelerating Biobased Business





#### SAFETY FIRST

In case of an emergency, the following alarms can be heard:

Fire:

Interrupted sound
We will go to the muster location outside



Gas:

Whooping sound We will go to the muster location inside

Stay calm, your host will give you further instructions





- Know where the emergency exits are located
- On the stairs, holding the handrail is mandatory
- Smoking is only allowed outside of the buildings, inside the special smoke cabins
- · Running or walking fast is not allowed
- Inside the plants the use of proper personal protection equipment is mandatory
- Persons with a V-badge (yellow visitor badge)
  have to be escorted by a SABIC employee at all
  times



We would like to hear from you how we can make today even safer!

# Agenda

9.00hr : arrival at Green Chemistry Campus

9.00-9.30hr : registration, safety instruction and morning coffee

9.30-10.00hr : plenary introduction Biobased Delta & Green Chemistry Campus

10.00-10.30hr : plenary Biorizon introduction

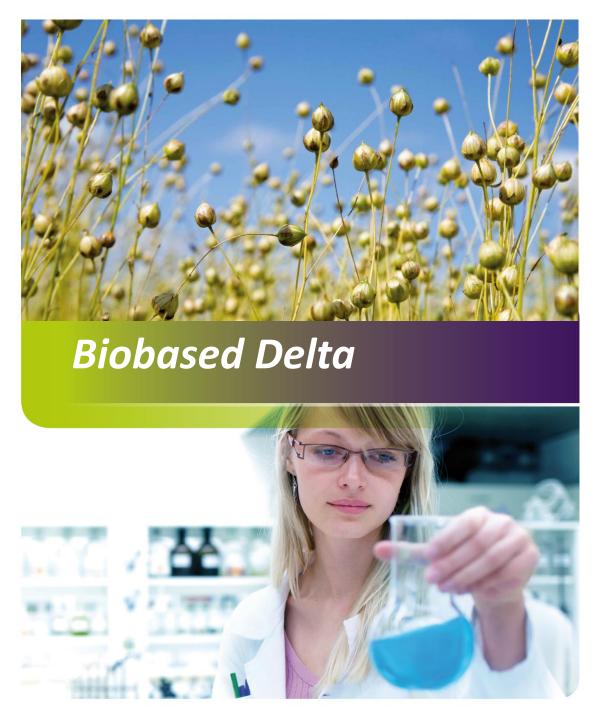
10.30-12.00hr : break outs based on interest and matching / visit to SABIC laboratories

12.00-12.30hr : lunch (possible including continuation of earlier break outs)

12.30-13.30hr : break outs based on interest and matching

13.30-14.00hr : wrap up & farewell (travel to Bergen op Zoom train station)







## **Biobased Delta**



- Based on strengths of the region
- Focus: Green feedstock, building blocks, Sustainable process industry
- Excellent geographic position and infrastructure
- Triple Helix approach
- Open Innovation
- International orientation











## Cluster organisation

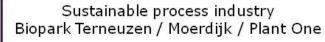


- Biobased Delta Foundation
- 5 member Board (all business background)
- Triple Helix Supervisory Board with business majority
- Core execution team
- Scientific Council
- Biobased SME Panel
- Biobased Brigade

## **Biobased Delta**



- Three main themes
- Solving the puzzle



Smart Delta Resources Cross sectorr - symbiosis

Energy Resource Efficiency

**Process** Intensification C1-Chemistry



Separation



Novel crops & feedstock Bio Innovation Garden / Prinseland / Westland

Expand Algea Residuals **Fibres** 

Plant Grow components





Conversion

Green Building Blocks Biorizon(GCC) / BE-Basic



Bioaromatics **Fibres** 

> Functional molecules

Grow

Expand

## **Developments**



 Valorisation: involving SMEs to effectuate short time to market of new biobased business

Noord-Holland: ABC Board Company Green Formula Groningen Gaastra Consultancy andfirden Technic: Glycanex Bioclean Algaspring BallastNedam IPM Overijsel: Van Wijhe Vert Gastreatment Service Lijnco Green Energ Groene Poort Linex Pro-Grass LambWeston Meijer DOW MEAF RoyalHaskoningDH\ Yara Sluiskil Sasdiik Fouraege Hogeschool Zeeland Impuls Zeeland SMA Zeeland Seafarm ZeelandSeaport The Bioplastic Factor ICL Industrial Products Heros Gelderland Zeeland Refinary Van Antwerpen Zeeland Aquacultuu Algaelink Roem van Yerseke VAM Wageningen University Advapack Biosando Arkema Limburg: Deltares SigTac Industrial Automation Automation Fevecon Faktor Plus Hortimare Sietec I-Basalt Cradle Crop Soiltech Stichting Contactgroep Textiel Fire Up International TuinbouwOntwikkelingsMaatschappij TCK Oisterwiik Isovlas Oisterwijk Fontys Hogeschool Royal Cosun Brabantse OntwikkelingsMaatschappij Van Maris Martens Loon- en grondwerken HGA Garden Advanced Fibre Placement Technology Avans Hogeschool Imperial Ventures Lauweriissen Techniek Fargate Services C-Max Technologies Waterschap Brabantse Delta Biopolymeren Applicatiecentrum Modified Materials Alpha Enzymes BMC International Clean Minerals Bio Energy AquaPro Appkuns Den Ouden Groenrecycling Cargill GreenBrothers Geurtz Group Rodenburg Biopolymer Varkensbedrijf Rijnen Oirschot Millyision Unipak Bijl groentechniek Deleco Drecht Coating Services Rabobank ZWNL C2Circle Stapper Duurzaam Advies Depron BioTorTech Rubia Nuplex Resins SABIC Sita Groep Raton Labee Groep Den Hartog Storage Terminals

 Tranisition: longer term effectuation of transition to biobased economy.
 Focus on sugars & lignin



# Green Chemistry Campus

General introduction

D. van der Pas Green Chemistry Campus











Accelerating Biobased Business



# **Green Chemistry Campus**

### **Brief introduction**

- Focused on strengths of the region: chemistry and agro
- Based on business need: more sustainable products & processes
- Awarded Center for Open Chemical Innovation
- Increase the success rate of biobased innovations
- Offering housing, lab and incubator services
- Initiated by SABIC, REWIN, Province Noord Brabant and municipality of Bergen op Zoom
- SABIC is landlord & active participant in developing the campus





# Two stage approach

#### Results and outlook

- Fase 1, proof of concept:
- Success: companies & knowledge institutes attrackted...
- ... but financially lagging behind, so more time needed proof true value
- Fase 2, continuation of fase 1:
- **Secret to success**: getting the symbioses between companies and with SABIC!
- Sustainable research programs
- Need for demo space, green feedstock and financial instruments













Nimaro Ageno



















Accelerating Biobased Business

# Green Chemistry Campus Facilities

## **Campus Innovation Center**

- Campus "heart"
- Start-up location
- Office garden
- Open innovation
- External identity
- Networking
- Service providers

## Process & analytical labs

- Research and technical focal point
- "Post-starters"
- Possibility for open and closed innovation
- Laboratories, offices

#### **Demo Plant**

- Scaling-up focus
- Product & market develoment
- Open and closed innovation
- Offices
- Market validation

#### Co-siting

- Manufacturing
- Large scale
- Commercialization

#### "Life cycle" from start-up to product- & market development









GREEN CHEMISTRY CAMPUS

# Creating symbioses (internally)

Combining short term & long term success

Facilitate short term (regional application focus)

#### Natural dyes

Cluster of SMEs working on bio dyes

#### Coatings

Cluster of SMEs applying biomaterials to coatings recipe.

#### Bio building materials

Creation of construction materials (inhouse & industrial)

Longer term (R&D focus)

#### Bio aromatics

TNO – VITO – GCC Technology development to produce bio aromatics for performance chemicals, coatings and materials. Focus on sugars and lignin as feedstock.

#### Program set up:

- 1. Green Cracker Feed
- 2.Catalytische pyrolysis to BTX
- 3. Sugars to aromatics
- 4. Lignin to aromatics
- 5. Value to coproducts

## Symbioses met SABIC

#### SABIC priorities

Togehter with Corporate R&D some themes have been selected and get follow up. Growing involvement SABIC:

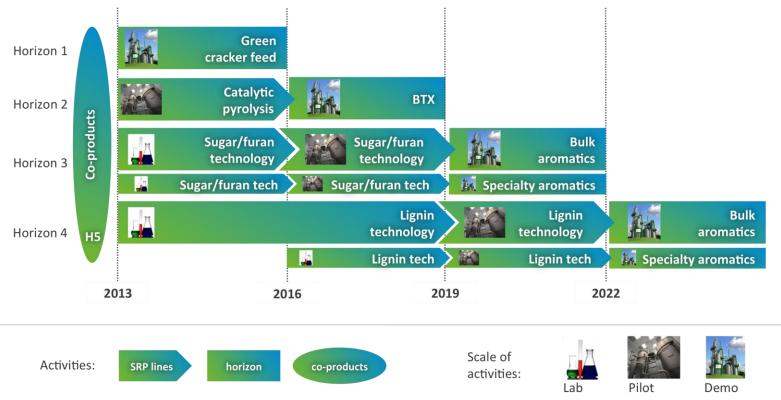
- Corporate R&D (R&D agenda)
- Corporate Venturing (search for relevant companies)
- Communications
- Sales & Procurement (using customer & supplier intelligence)
- Internal steering cie under construction (overlooking the above themes)







## Biorizon





# Thank you for your kind attention Any questions

Gemeente Bergen op Zoo

NV REWIN
WEST-BRABAN

