POWER4BIO webinar series: Food & Feed, session 5. 4 November 2020, 10 am CET

Technical examples of regional initiatives

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Opportunities for regional initiatives

Techno-economic opportunities:

- Vertical integration: minimize transport
- Regional development of similar activities: critical mass, create economies of scale
- Shared exploitation of utilities

Socio-economic opportunities, co-operation:

- Exploitation of regional identity
- Intended activities in Regional development plan
- Regional creation of added value
- Development from regional public-private partnership
- Co-operation, regional network
- Open technology platform

Enviro-economic opportunities:

- Total biomass valorisation, for different applications

Derived from:
Donner, M, A Verniquet, A de Souza, J Broeze, K Kayser & H De Vries: Critical success and risk factors for Circular Business Models valorising agricultural waste and by-products, *Resources, Conservation & Recycling* (submitted)

From small to large regional initiatives

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BIOECONOMY

- Conventional mixed farming
  - Crops
  - Livestock
- Agro-complex
- Agro-processing cluster

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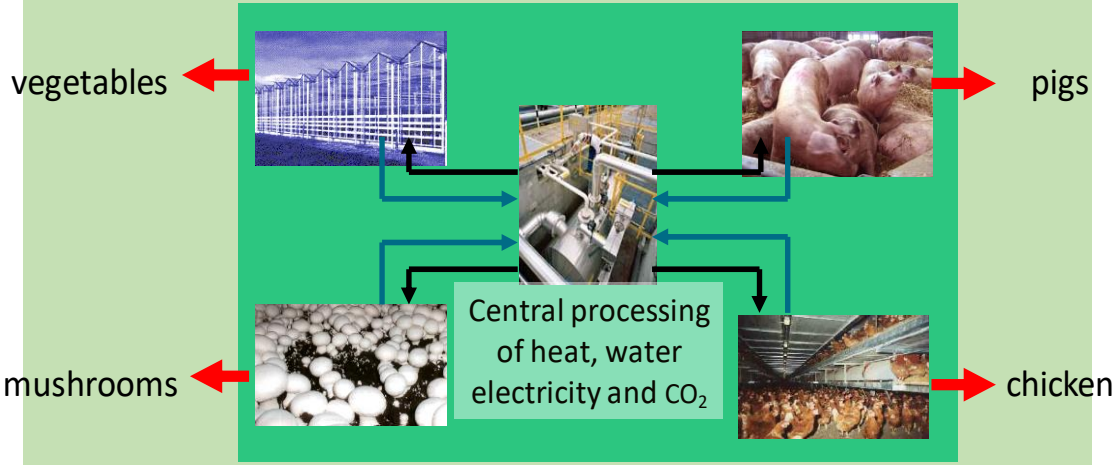
Regional integrated farming initiative New Mixed Farm (Limburg, NL)

- Spatial clustering in region
  - Two separate farms: together larger scale
  - Integrated processing of poultry + pig manure (unique combination)
  - Production intensive
- Planned start: 2007;
- **Building: now!!**



- Drivers:
  - Pro-active regional development organization
  - Public-private initiatives (innovating agro-food production)
- Success condition:
  - Logistic position
  - Serviced/shared transport to urban market cluster
- Drawback/hurdles:
  - Social resistance (large-scale farming)

Traditional “agro-complex”

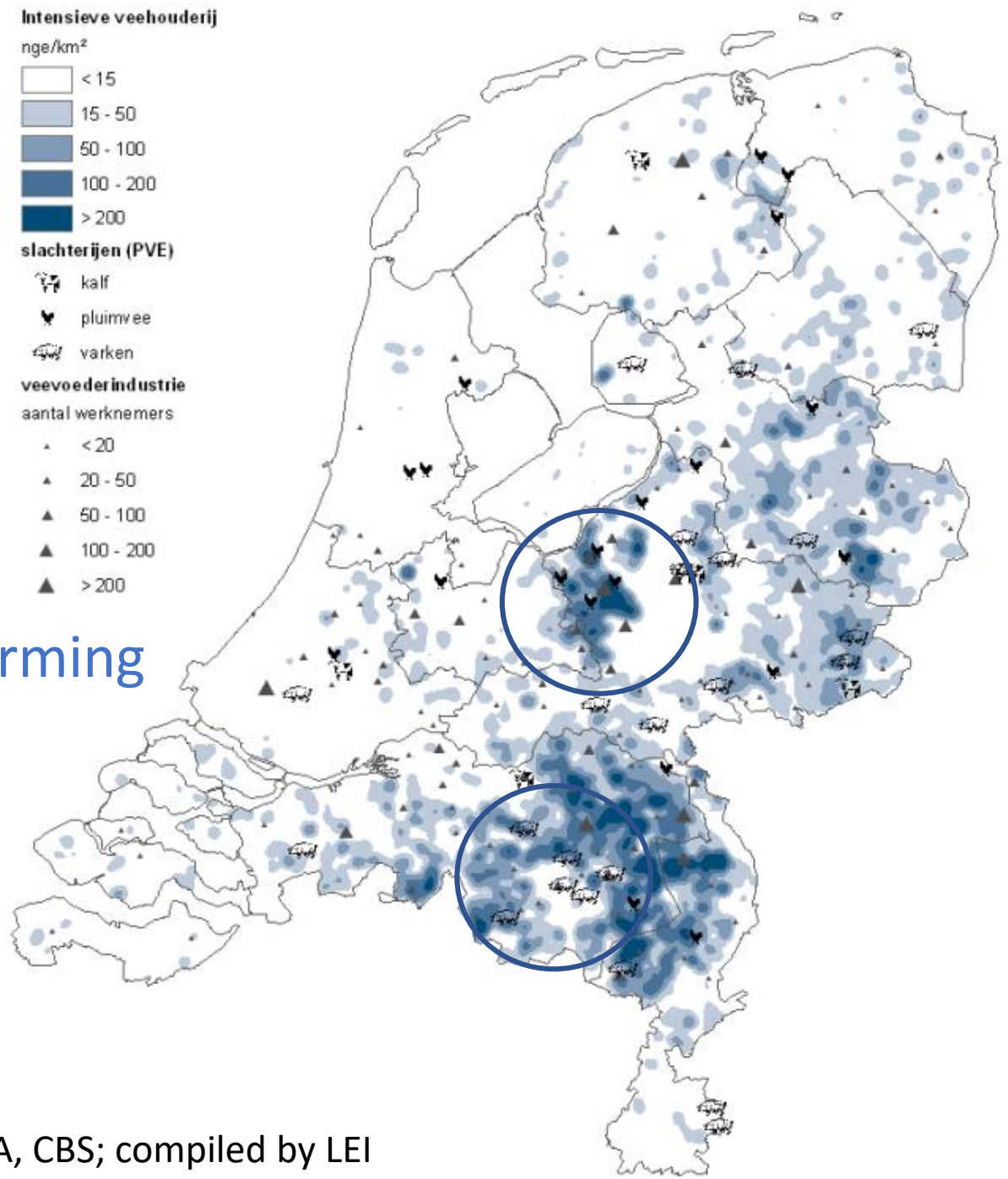
Regional activities

- agricultural production:
  - livestock (breeding + fattening)
  - arable farming (seeds + end-products)
- supporting activities (partly in co-operatives, local SMEs)
- primary processing (slaughter)

Further processing is decoupled from regional production (commonly connected to urban market)

- meat deboning, cereal/starch processing, ...

Traditional



- Intensive livestock farming

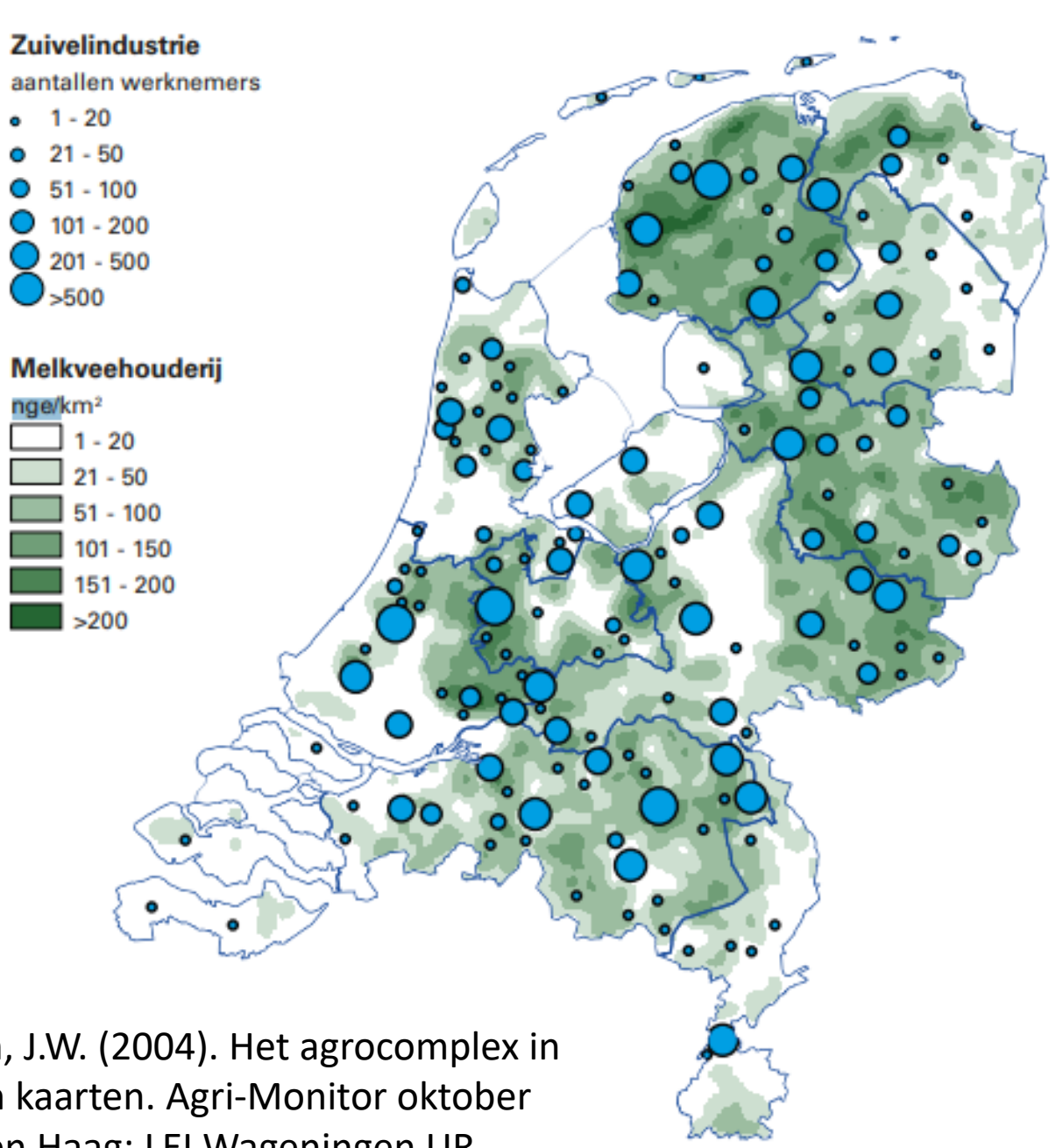
🐖 Butchers

Δ Feed industry

Source LISA, CBS; compiled by LEI

Traditional

- Dairy industry
- Dairy farm



Kuhlman, J.W. (2004). Het agrocomplex in cijfers en kaarten. Agri-Monitor oktober 2004. Den Haag: LEI Wageningen UR.

However: The past decades the major trend in agricultural based industry is a trend of scaling and centralizing their processing:

Nowadays:
2 sugar factories

The past decades the major trend in agricultural based industry is a trend of scaling and centralizing their processing:

These 2 factories are producing 6 times more sugar than the 38 factories together did in 1900.

This trend was driven by the advantages of ‘Economy of scale’ and relatively low transportation costs

Sugar beets

- Economy of scale prevails:
  increased transport cost versus lower investment cost
- Short season, relatively expensive technology
- Global market; industrial end product
- Better storability of biomass and products

- Main procedure for many refined agro-products

Agro-processing clusters

Further processing is coupled to the regional production

From local to national market

Grap'Sud group

- Core business: transforming waste and by-products from winemaking into value added products and applications

- Trigger for the initiative: Valorisation of grape marc for destillation as a response to legal obligations (1970)

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Grap'Sud group synergy

- Cooperative structure
- 6 production sites
- 4 storage and transit sites
- 1 financial holding company, including
- ROMANN SAS, wine distillery
- GSR CHAMPAGNE-ARDENNES SAS, wine distillery.
- INOSUD SAS, produce grape sugar, grape juice concentrates and tartaric acid
- NUTRITIS SAS, recovery of fruit sugars (fructose, glucose and sucrose) from the different fruit stations

→shared infrastructure and financing

→shared know-how

→shared waste delivery&disposal

- This cooperation enables:
- The production of second generation **bioethanol**
- Valorization of **dry by-products** for the production of steam in our biomass boiler
- Valorisation of **wet by-products** towards agronomy: compost and fertilizers valued in the vines of our members
- Production of fodder for the department's farms

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Grap'Sud group products

Application area's

- Food industry
- Nutraceutical
- Oenology
- Agriculture and agro-industries
- Alcohols & Spirits

Portfolio examples

- Sugars
- Juice concentrates
- Colourants
- Polyphenols
- Tartaric acid
- Organic fertilizer
- Alcohols above 92%

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Synergies in agro-processing clusters Business park Zuid-Groningen

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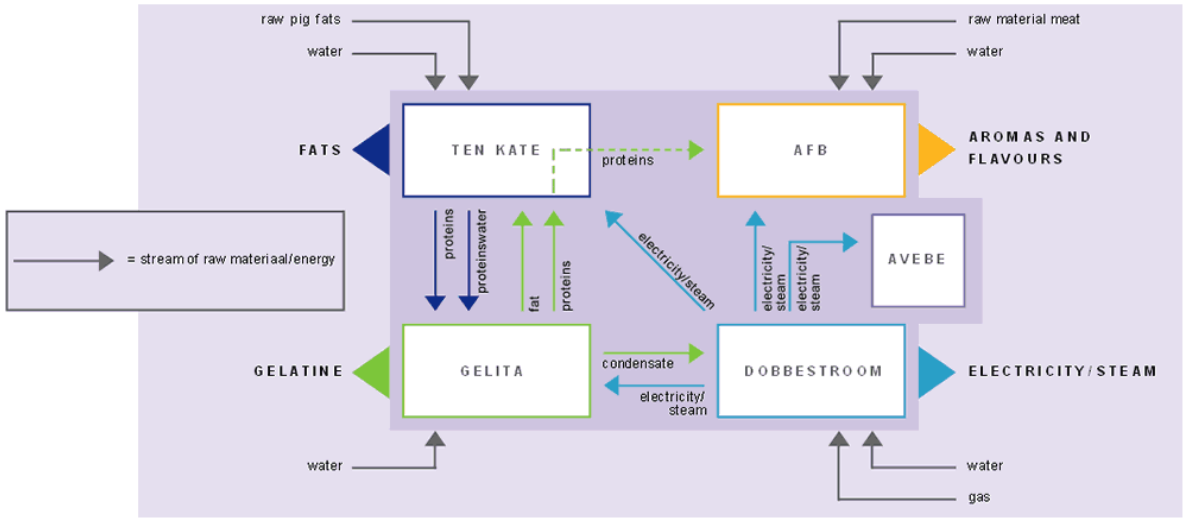
Utilities sharing:

- energy (combined power & heat)
- waste water treatment

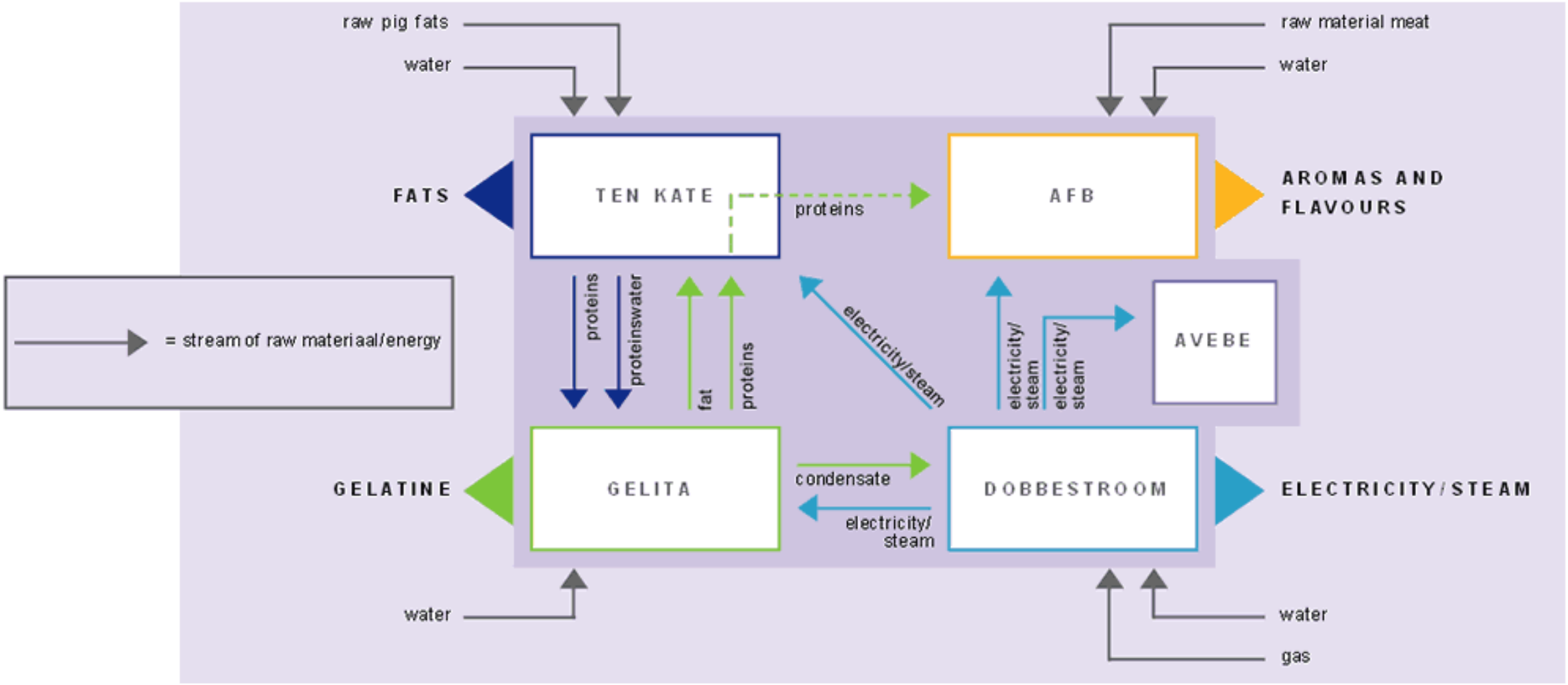
Synergies in cluster:

- waste water from fat processing industry: input for gelatin producer
- combination of different waste water characteristics
  -> more effective biological waste water treatment

- Drivers:
  - Pro-active regional development organization
  - Costs of waste water treatment
- Success condition:
  - visionary entrepreneurs
- Drawback/hurdles
  - -



Business park Zuid-Groningen



Integrated regional biogas production

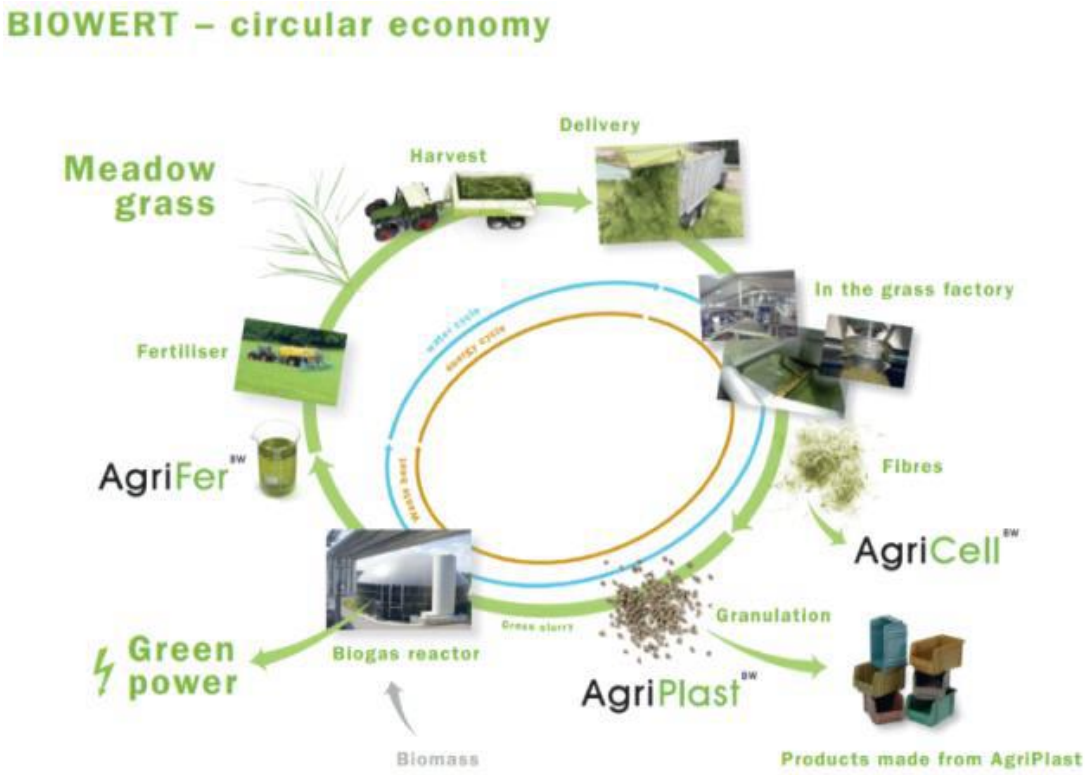
- BIOWERT
- PILZE-NAGY

D3.4 Best practice examples report from CIRCE, BZN, WR, DBFZ;

https://power4bio.eu/wp-content/uploads/2020/04/POWER4BIO_D3.4_Best_practices_of_bio-based_solutions.pdf

Joint regional biogas production

- BIOWERT
- *“Meadow grass silage biorefinery producing grass fibre enhanced plastic granulates and natural insulation material combined with biogas plant producing electrical energy from used grass juice and food”.*



D3.4 Best practice examples report from CIRCE, BZN, WR, DBFZ;
https://biowert.com/company

Joint regional biogas production

- PILZE-NAGY
- *“Production of oyster mushroom and oyster mushroom substrate based on straw, combined with the valorisation of the by-products of mushroom production and other agricultural and food industrial processes by producing electrical energy in a biogas plant”.*

D3.4 Best practice examples report from CIRCE, BZN, WR, DBFZ;
http://pleurotus.hu/

Many new initiatives in business parcs

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- New Dutch Business Parcs
  - Laarberg
  - Greenport Venlo
- Very succesfull
  - Biorefinery Pomacle-Bazancourt
    Near Reims, France

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Synergies in post-harvest/trade Greenport Venlo (Limburg, NL)

Enhancing added value from horticulture production: whole chain

Activities:

- Divers fresh products available
- vegetable semi-processing (cutting)
- semi-prepared meals
- service activities

- Drivers:
  - Urban market (Ruhr Area)
  - Upcoming demand for convenience food
- Success condition:
  - Logistic position close to Ruhr Area
  - Serviced/shared transport to urban market cluster
  - Many entrepeneurs in one cluster
- Drawback/hurdles:
  - -

New added value creation in rural areas
Business park Laarberg (Achterhoek, NL)

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Aimed activities:

- biorefining (manure processing)
- role in protein transition
  - co-operation between regional producers of protein crops, processing companies, retailers and catering companies
  - seek co-operation with *Green Protein Alliance* for market development
  - the business park aspires to become a regional hub for protein rich processing side streams (starting with 2 companies)

- Drivers:
  - Adapt regional 'agro-complex' to changing (socio-economic/market) situations
- Success condition:
  - Regional agricultural production
  - Specific destination plan
- Drawback/hurdles:
  - Processing side streams are sourced from elsewhere

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https://www.laarberg.nl/bioraffinage/

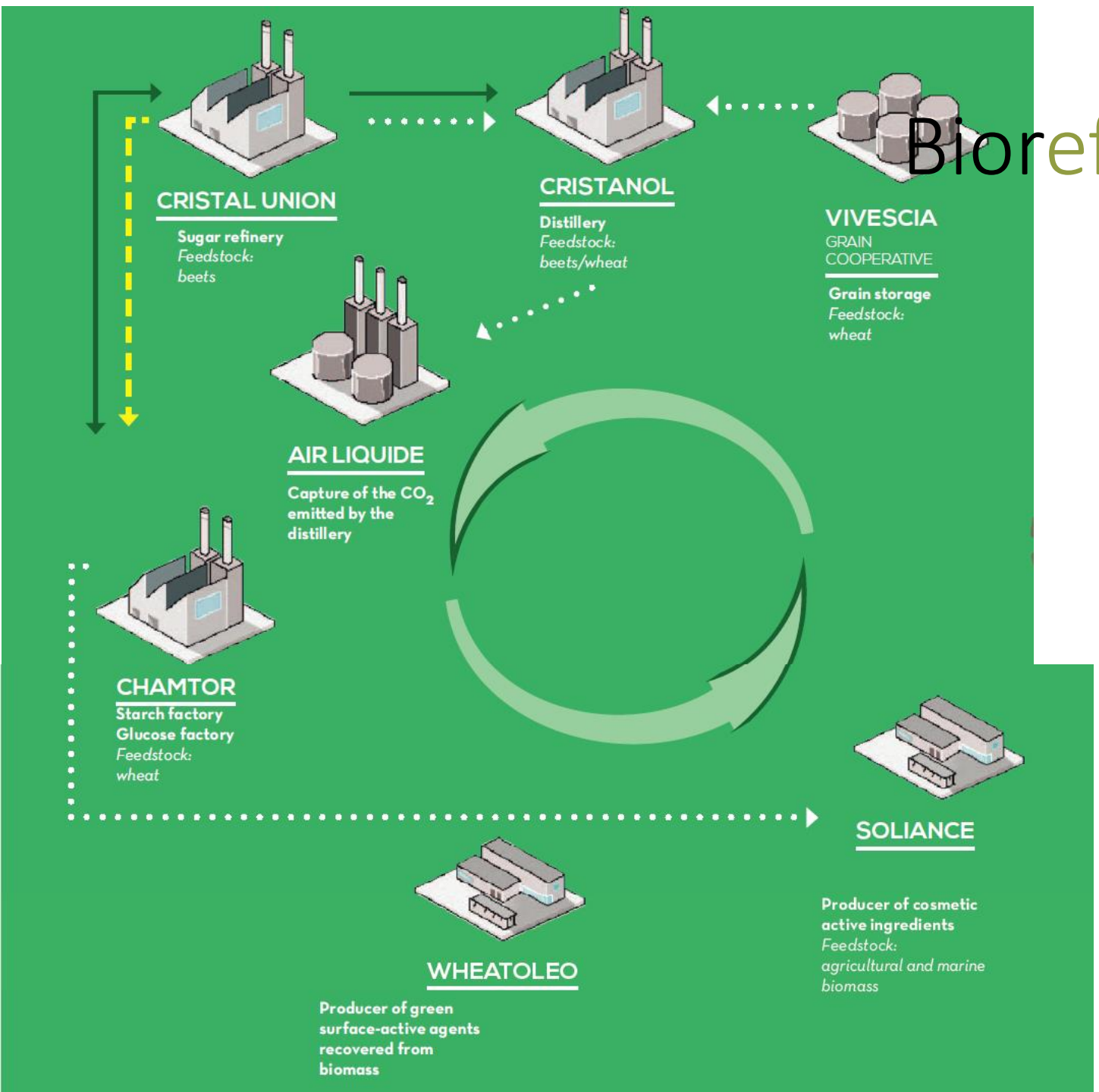
Pomacle-Bazancourt

- Integrated biorefinery Les Sohettes, started in 1950s
- Grain and sugarbeet area
- Integrated biorefinery
- Production
- R&D

- Knowledge: ARD
  - Privately financed
  - Wide range of pilot facilities
- Large companies:
  - Cristal Union (beet)
  - Chamtor (grain)
  - Christanol (ethanol)

https://www.economiecirculaire.org/data/sources/users/1958/plaquettecomplexe-agro-industriel-des-sohettes.pdf

Biorefinery part



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water/condensate recovery

Reduced groundwater abstraction and energy recovery

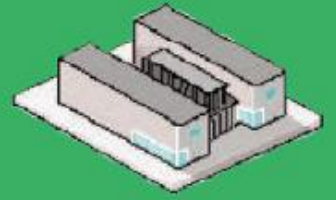
steam/energy

The use of steam produced through cogeneration / The production of bioethanol from beet and wheat coproducts

products/coproducts

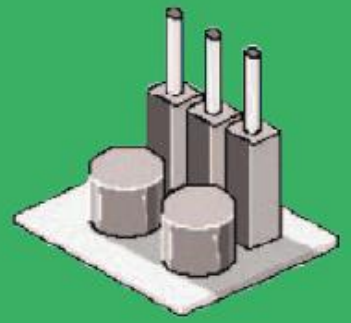
The products or coproducts of one company can be used as raw materials by another.

Innovation part



ARD

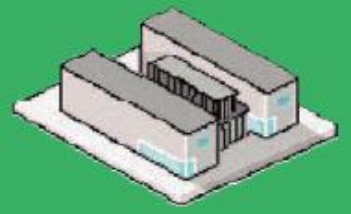
R&D center focused on industrial biotechnology



FUTUROL PROJECT

PROCETHOL 2G

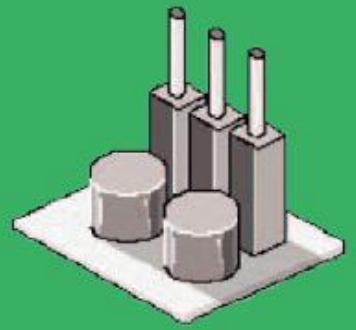
Production of second-generation ethanol



EXCELLENCE CENTER IN WHITE BIOTECHNOLOGY

ÉCOLE CENTRALE PARIS,
AGROPARISTECH,
NEOMA BUSINESS SCHOOL

Research laboratory, technology center and business incubator in collaboration with URCA.



BIO DEMO

Industrial demonstrator in the field of biotechnology

Take home message: Regional Synergy

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- Economy of scale through combining efforts: critical mass

- Residual stream synergy: re-use by others, direct application, shorter transportation distance, less storage, possible distribution of residual streams over land, or as feed
- Product synergy: the products or by-products of one company form the raw materials of the other.

- Water synergy: Condensation water for irrigation, less groundwater extraction
- Energy synergy: production of biogas from side-streams and manure. Subsequently, steam can be produced by CHP, low quality heat to horticulture or cities.
- Steam synergy: Mutual steam supply

- R&D synergy: joint innovation, exchanging knowledge & experience
- Organizational synergy: logistics, advise on business, construction and operation of new facilities and training programs

Regional ambitions

- Regions have drafted a short document including: activities, feedstocks, processes, products related to bio-economy.

- Regions include: Lviv region (Ukraine), Southern Great Plains (Hungary), South Bohemia (Czech republic), Nitra (Slovakia), Mazovia (Poland), Flanders, Bavaria, Central Germany (Saxony, Saxony-Anhalt, Thuringia), Andalusia, 11 regions in Italy.

Regional ambitions: bioeconomy feedstocks

Biomass		Example region
Agricultural waste	Straw, maize, horticulture	Germany, Spain, Poland, Slovakia, Czech, Belgium
Forest residues	Cuttings, surplesses	Ukraine, and others
Industrial by products	Paper and pulp, whey	Hungary, Belgium
Fishery waste		Belgium
Biotech applications to organic acids	Succinic acid	Italy
Sludge		Germany, Poland
Energy crops/biofuels	Maize, willow, oil seeds	Slovakia, Poland, Germany
Olive sector		Spain

Thank you for your attention

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Next session at 11 am CET

Session 6. Learnings for high potential value chains

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Bonus material

- DCOOP video
- 75.000 families of farmers
- Product: human nutrition and bioactive compounds
- From food industry by-products (e.g. olive residues like pomace, seeds, stones & leaves; goat cheese whey)

Thank you for your attention

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