



# CAPTURE

Korneel Rabaey

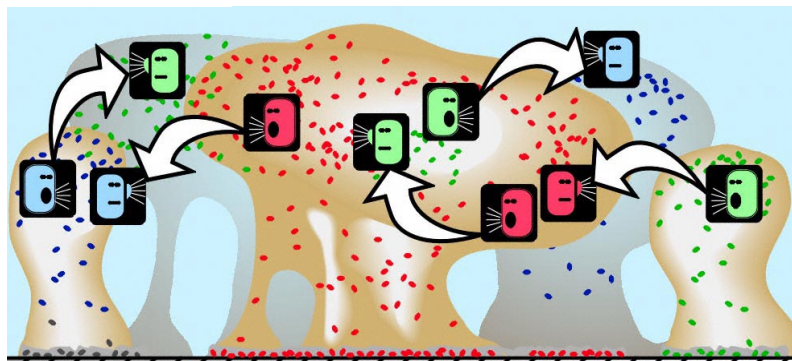
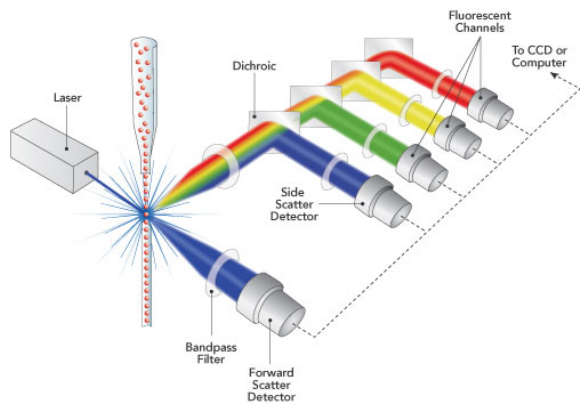
# Center for Microbial Ecology and Technology

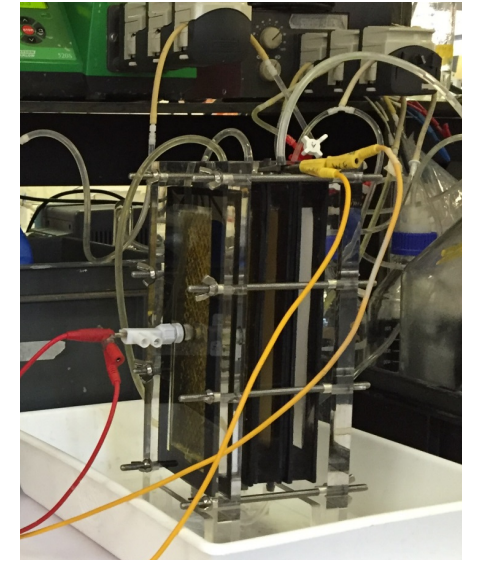
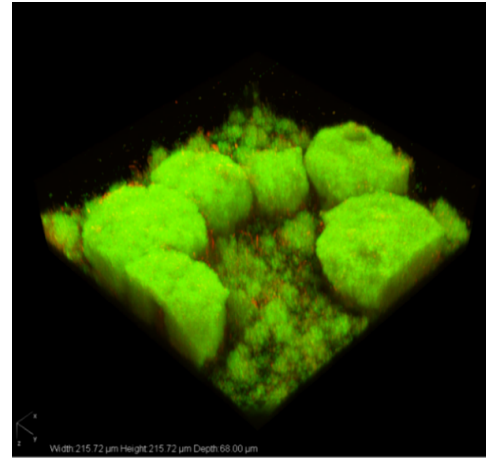
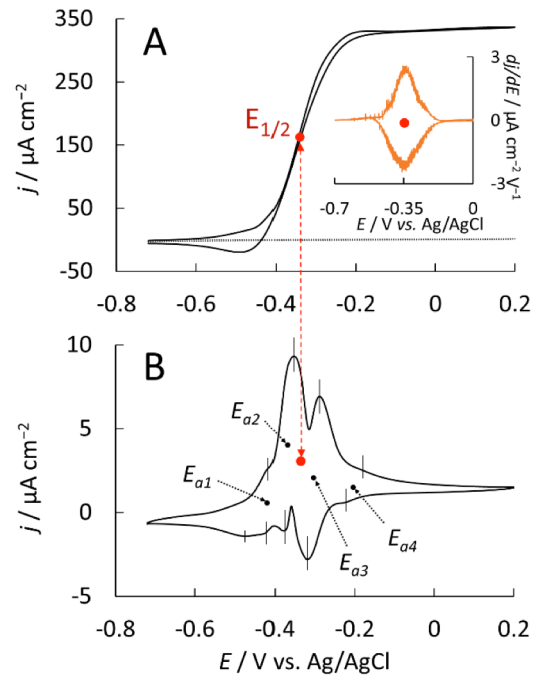
Faculty of Bioscience Engineering  $\Rightarrow$  Department of Biotechnology  $\Rightarrow$  CMET

80 staff: 20 postdoctoral, 40 PhD, 10 support staff (5 supported through UGent)

Annually  $\sim$  30 master students for thesis

5 full time professors, 3 guest professors





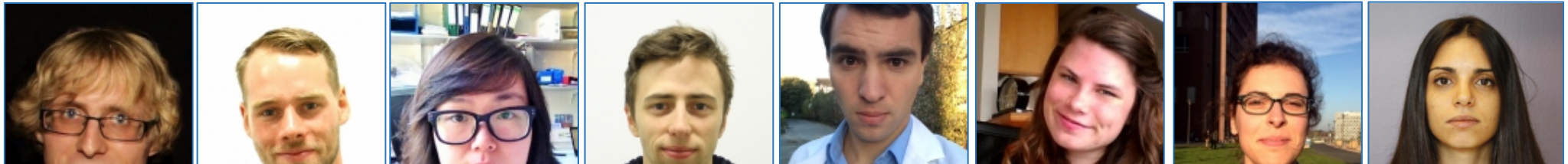
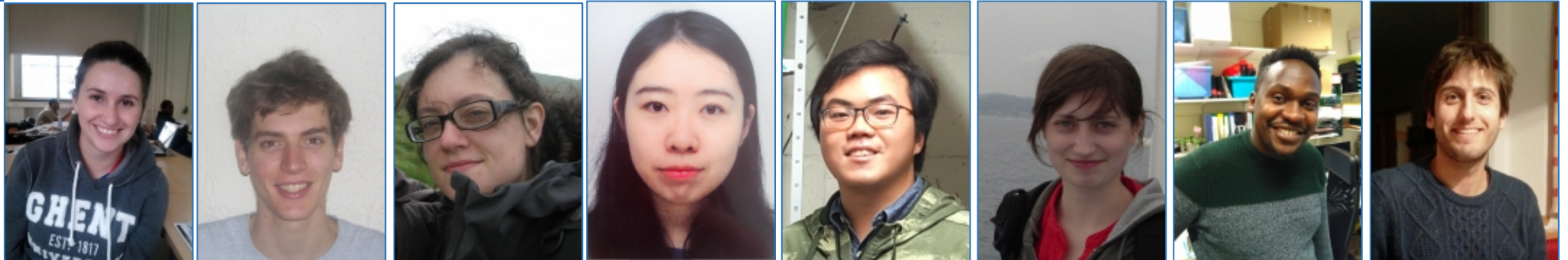


Postdocs



12 nationalities  
11/28 Belgian

PhD students



**And yet, this scale of operation is insufficient to truly address major challenges**



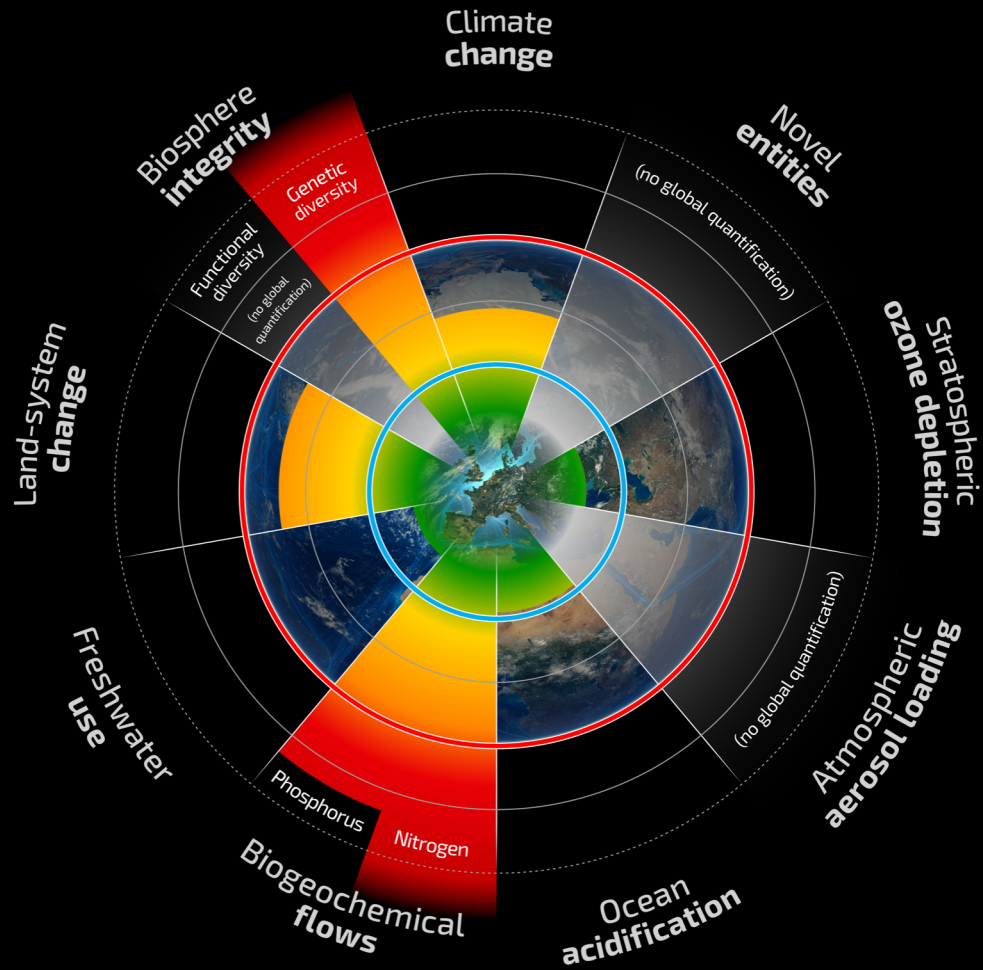


## Implementation of technology for resource recovery is slow

- Decentralized, project based
- Targets are undefined
- Business case is limited or unclear for problem owner

# Planetary Boundaries

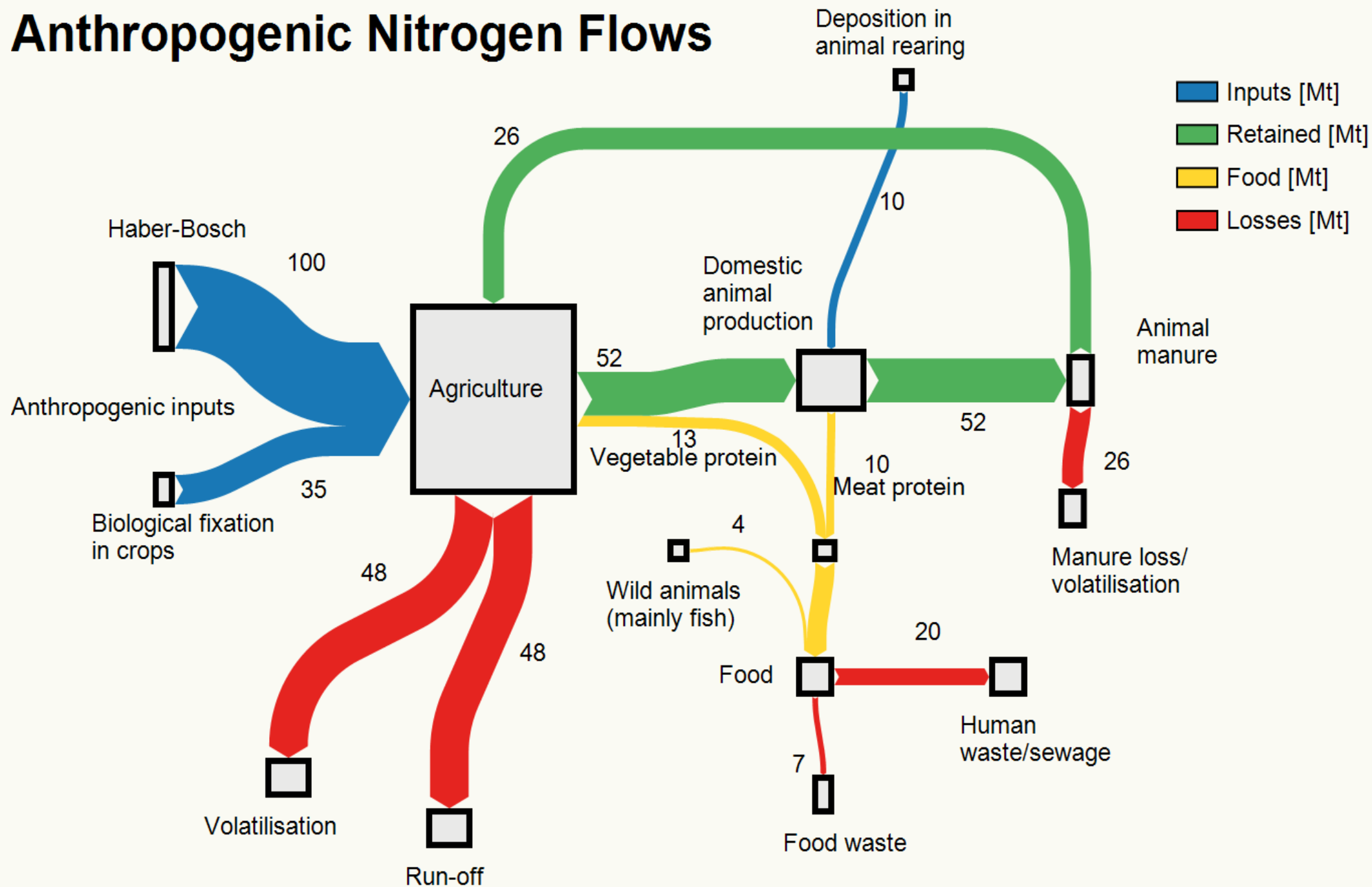
A safe operating space for humanity

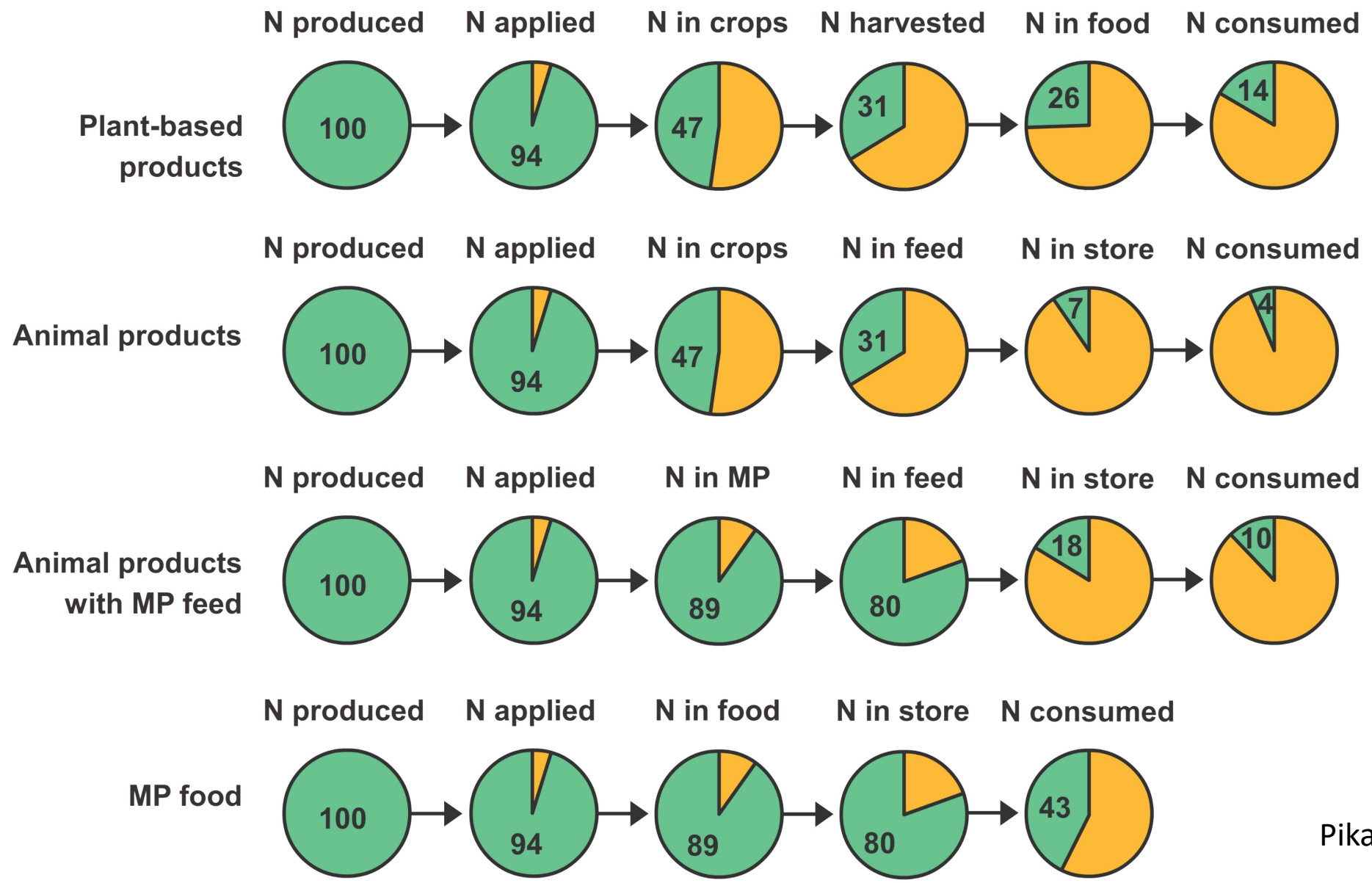


- Beyond zone of uncertainty (high risk)
- In zone of uncertainty (increasing risk)
- Below boundary (safe)
- Boundary not yet quantified



# Anthropogenic Nitrogen Flows

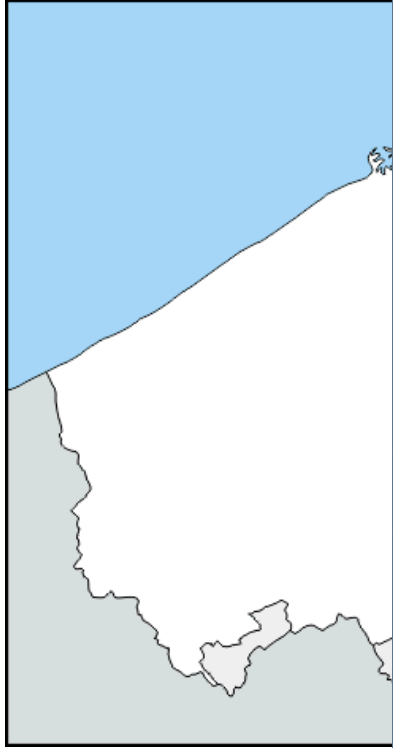




Pikaar *et al.* ES&T2017

*Elected Best Feature Article 2017*



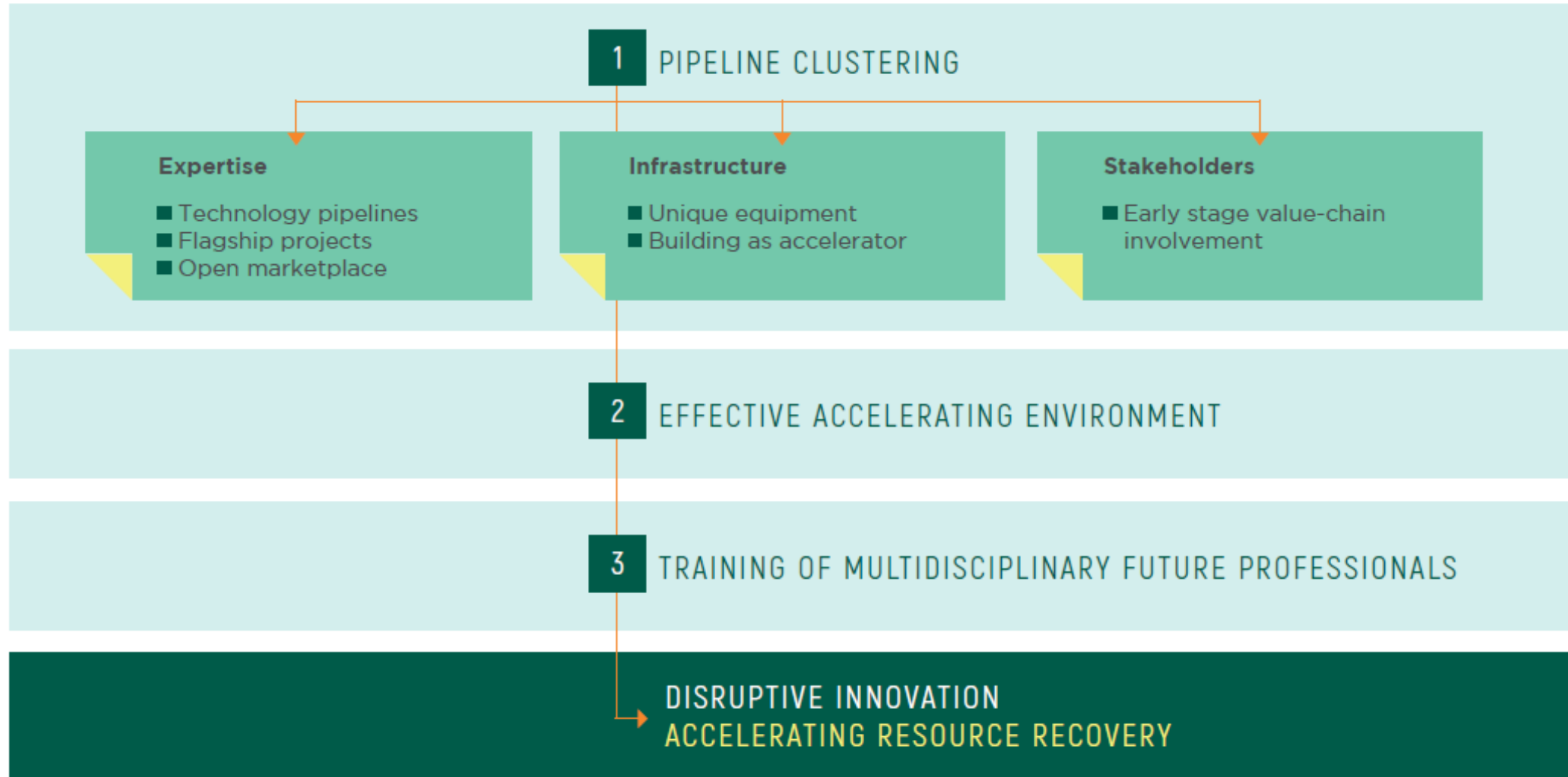


# CAPTURE - Research Principles

- CAPTURE wants to deliver excellent research and technology development through open collaboration between researchers, industry and other stakeholders
- Choices need to be made: CAPTURE focuses on programs together with partners:
  - These are not exclusive rather priority is given
  - Academic freedom is in no way curtailed
- Growth is certainly not the only or key driver



# The CAPTURE approach





- Level 3 + 4: Business Accelerator
- Level 1+ 2: Technology Accelerator (Testing facilities, benches and chairs)
- Level 0: Tech Hall: upscaling & demonstration





Source



Link innovative technology  
with methodological support



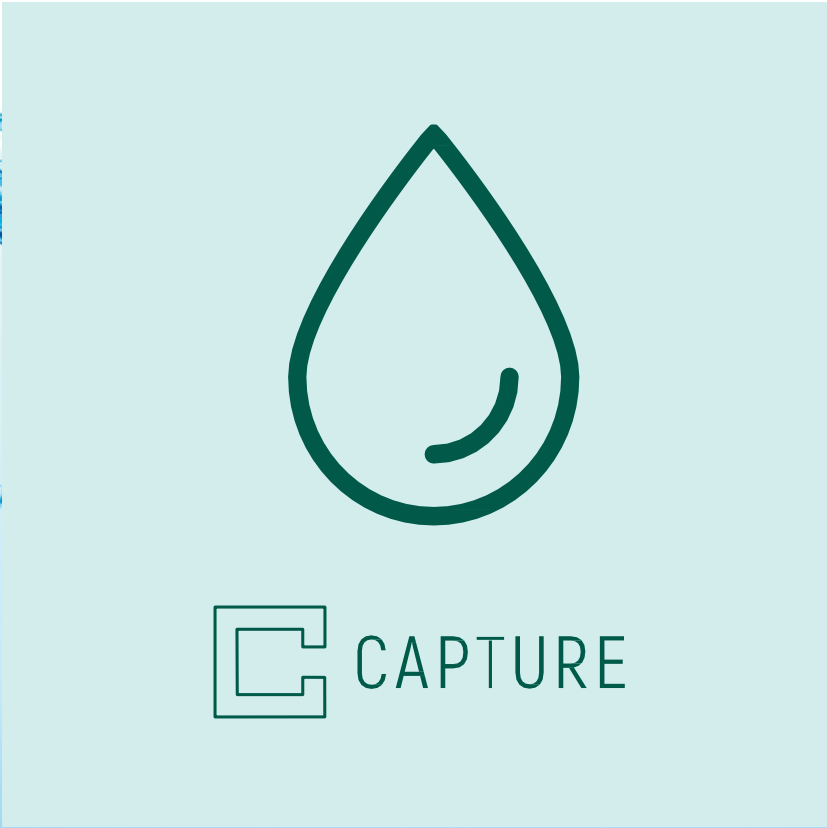
Link people  
to infrastructure

Demand

Process water  
and wastewater  
treatment  
of the future

Carbon Capture  
and Utilization

Plastics,  
Bulk chemicals,  
Fuels





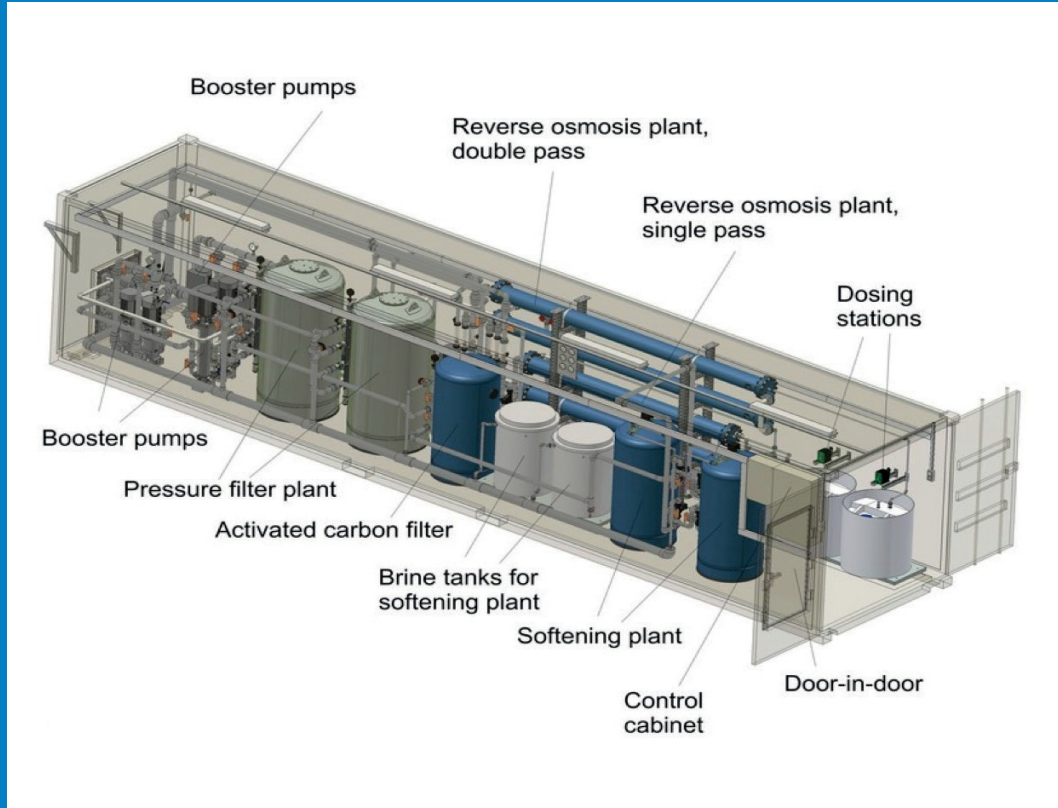


# Flagship project: improved

- Worldwide unique infrastructure
- 3 Modular Mobile units on 3 sites
- 4.8 M€

**IMPROVED**  
industrial water use

INTEGRALE  
MOBIELE  
PROCESWATERVOORZIENING  
VOOR EEN  
ECONOMISCHE  
DELTA



**Interreg**  
Vlaanderen-Nederland  
Europees Fonds voor Regionale Ontwikkeling



UNIVERSITEIT  
GENT



**BASF**  
The Chemical Company



**Dow**



**SKIW**  
Natuurwetenschap



**IEC**



UNIVERSITY  
OF APPLIED SCIENCES



i-CLEANTECH  
VLAANDEREN  
enabling the future



**ovides**  
Industriewater



**YARA**



**Viakwa**  
VLAANDERSE KENNISCENTRUM WATER  
VLAANDERS KENNISCENTRUM WATER



Provincie  
Oost-Vlaanderen  
Voor ieder van ons



Provincie Zeeland



west-vlaanderen  
de gedreven provincie

[www.improvedwater.eu](http://www.improvedwater.eu)





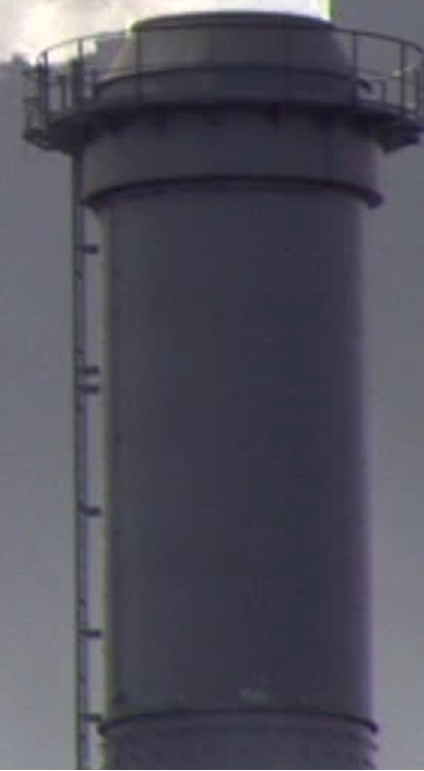
# CAPTURE water

- Urine treatment, focus on N recovery
- Production of feed and food as microbial protein
- Production of organic building blocks from dilute streams
- ....



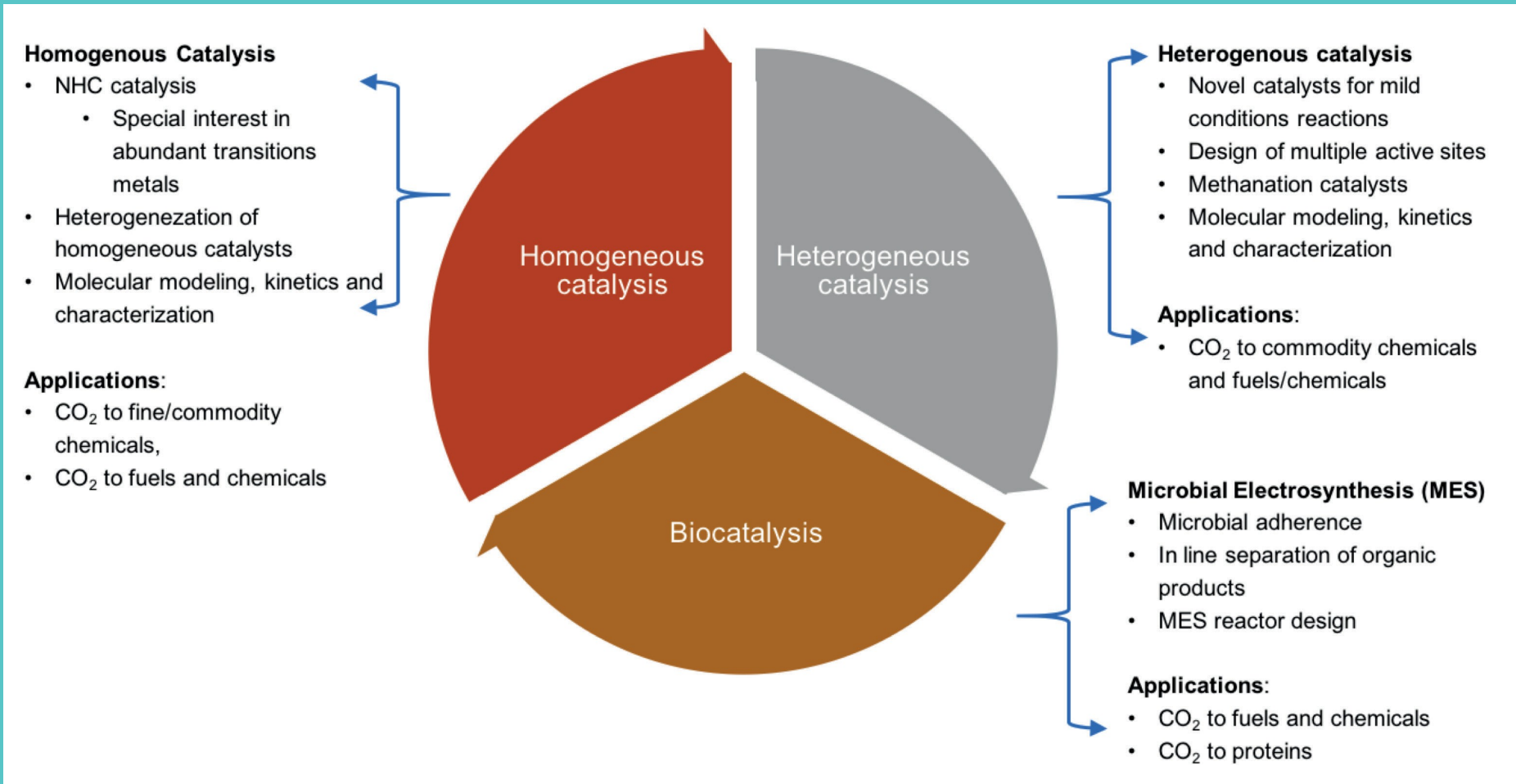


 CAPTURE





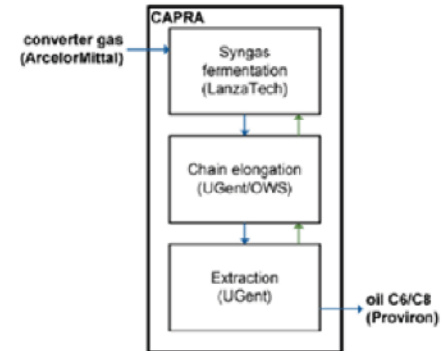
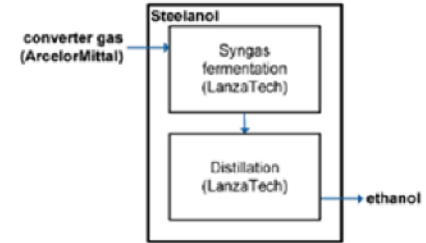
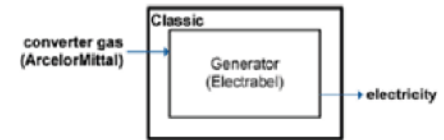
# Industrial affiliate program



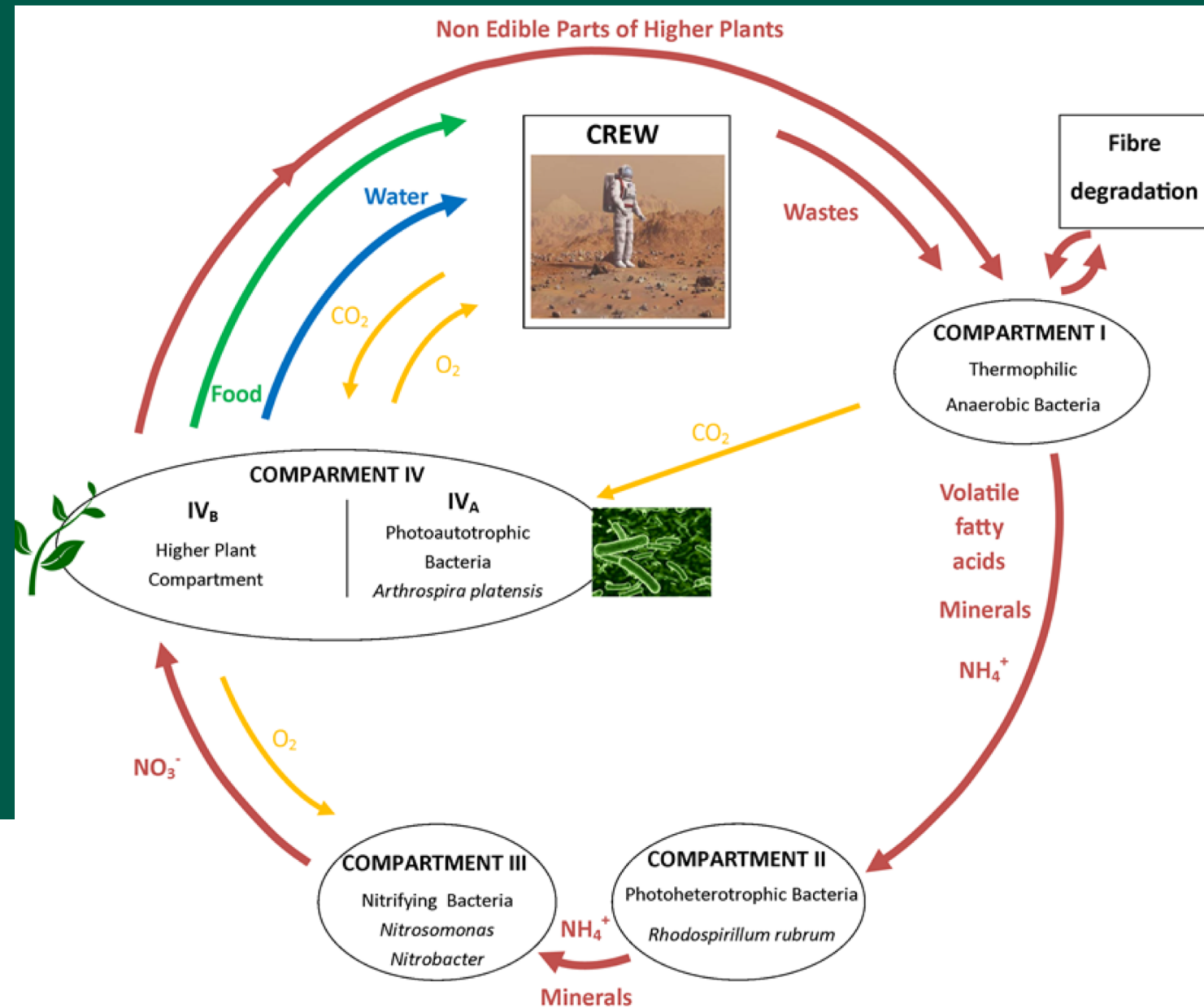
# CAPRA



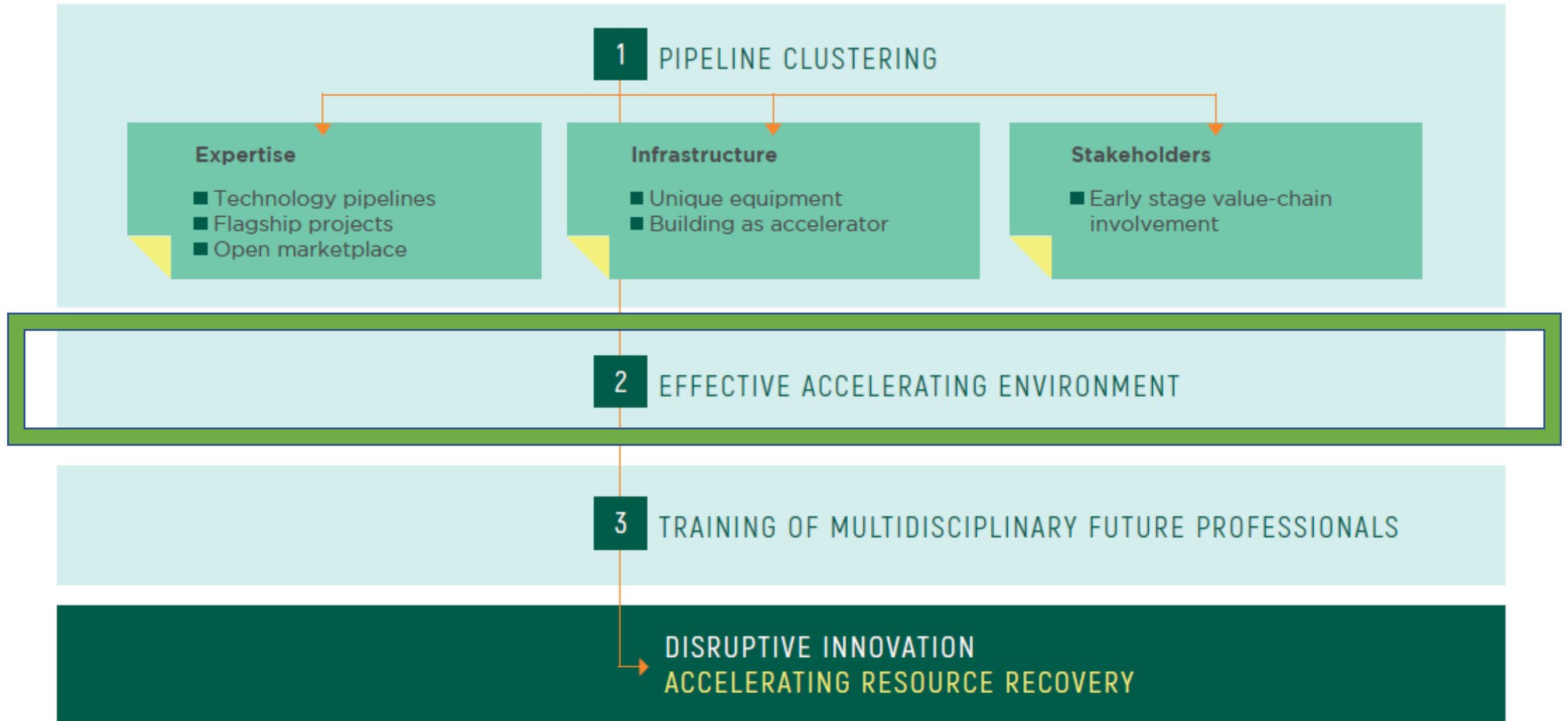
**CATALISTI**  
WE MEAN BUSINESS



# MELiSSA



# The CAPTURE approach





# Effective cleantech acceleration environment

Entrepreneurs

Researchers

Start-ups SME's

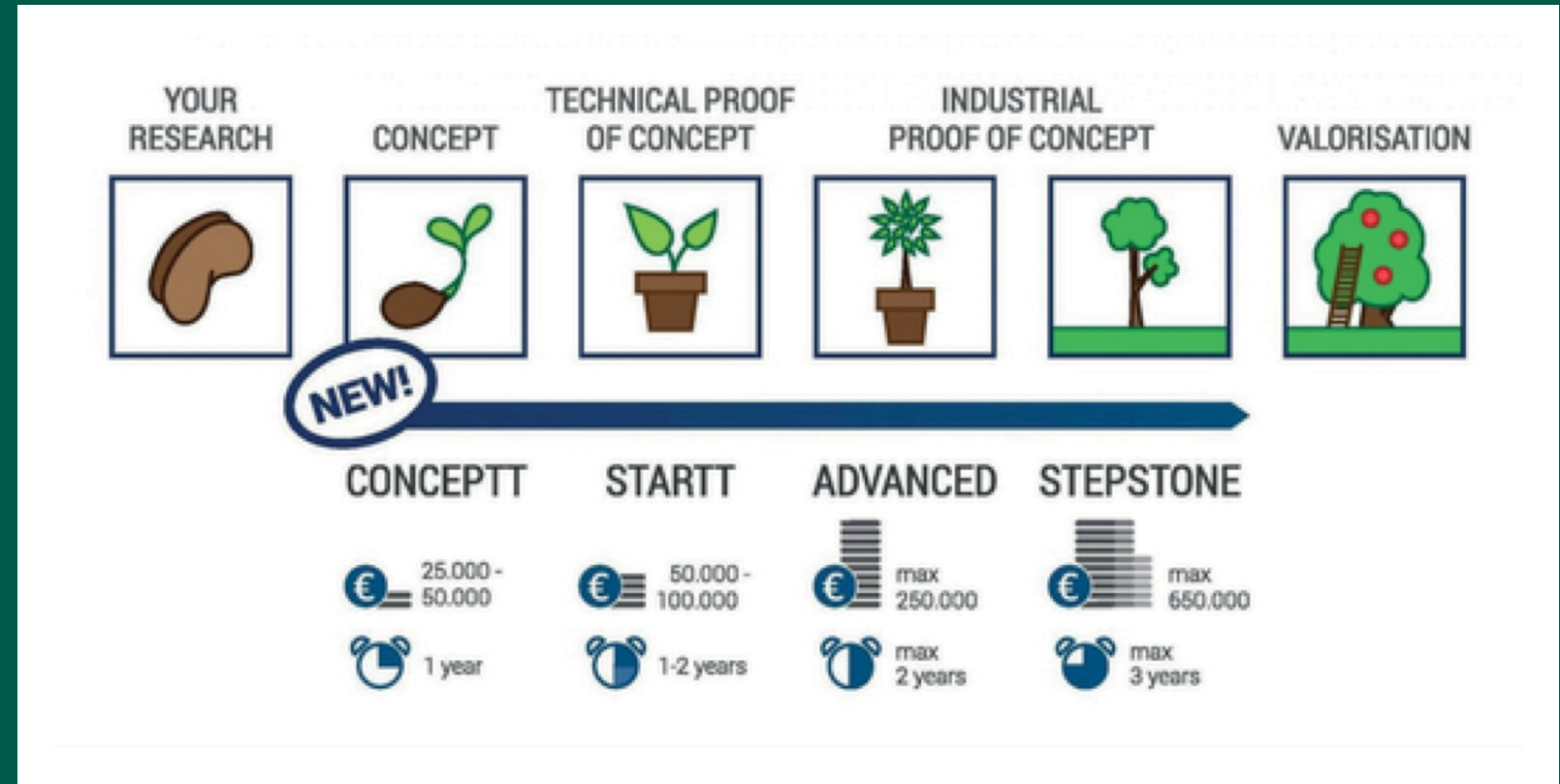
Corporate R&D labs

## Services supporting:

Incubation

Growth

Internationalisation



incubatie & innovatiecentrum Universiteit Gent  
Technologiepark-Zwijnaarde 3, 9052 Gent (Zwijnaarde)



# Entrepreneurship: spin-offs



STRATEGICWATER

Est. 2017

## Smart Systems, Effective Solutions

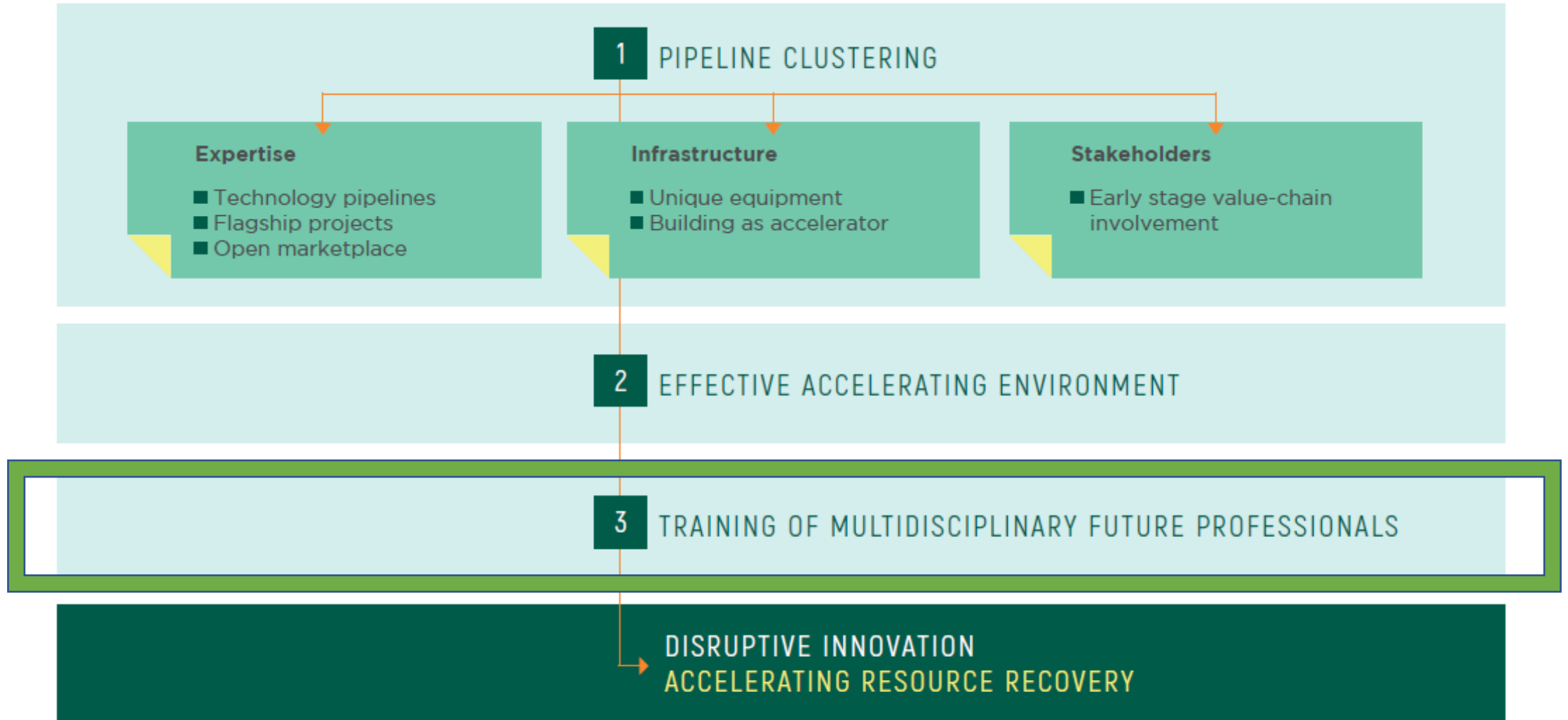
Strategic Water is a water and environmental sanitation engineering firm specialising in data management and strategic systems planning in the water and sanitation sector in emerging markets. Our mission is to bring hard data and machine learning to the water supply chain in order to streamline services across the globe.



Est. 2017

AM-TEAM is a globally active company, focussing on advanced process modelling. The unique combination of process understanding and advanced modelling frameworks brings models very close to reality, allowing drastic process improvement and accelerated scale-up in the water, biotech and pharma fields.

# The CAPTURE approach



# Training of multidisciplinary (future) professionals

- Super-W European Joint Doctorate Programme
  - 15 PhD Students
  - Sustainable Resource Recovery from Water
- EIT Raw Materials
  - New International MSc SINREM
- Centre for Environmental Science & Technology
- Multiple International partners – GUGC?
- Lifelong Learning





# CAPTURE - summary

- Collaborative center based on excellent science, translation
- Good model for interaction with MELiSSA to couple terrestrial applications
  - Research
  - Education
  - Commercialisation



# E CAPTURE

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