Cambioscop Mid-term: 2.5 y later, where are we?

Lorie Hamelin, Ph.D
Researcher, PI of the Cambioscop project

@hamelinlab  hamelin@insa-toulouse.fr

Cambioscop Mid-term Webinar • 28.10.2020
• Thanks to all of you!

• Inform a larger audience on our results

• Get your feedback (!)

  • This project is for you: We want our results to be useful / usable / used!
• Overview of the agenda

• Mics (please shut them)

• Q&A procedure & chat
Why Cambioscop?

Carbon management & Bioresources strategies for scoping the transition towards low fossil carbon

Routes towards low fossil C

- **No C (decarbonize)**
  - Essentially electricity!
  - Land dependant

- **Biomass C**
  - Residues

- **Atmospheric C**

- **Recycle C**

---

Why Cambioscop?
Cambioscop

Year 4-5

- Carbon redistribution (regional + vs threshold)
- Biomass conversion pathways (LCI)
- Most promising pathways
- Logistics, markets, economy of scale
- Research Objectives (RO)

Year 2-3-4

- Modular process-based database
- Carbon circularity, time & narratives // Methodological development (prospective)
- Geo- & time-explicit bioeconomy LCI Database

Year 1-2

- Land use changes
- Bio-pumps
- Spatially-explicit residual biomass baseline
- C, N, P flows of current uses

Research Objectives (RO)

CAMBIOSSCOP
Carbon management towards low fossil carbon use
Key highlights – RO1

• Spatial baseline established for key residual streams, at various resolutions

• 3 papers (one on-going, 2 published)
  • *Crop residues may be a key feedstock to bioeconomy but how reliable are current estimation methods?*. https://authors.elsevier.com/c/1bttF3HVLKiBw0
  • *Towards local bioeconomy: A stepwise framework for high-resolution spatial quantification of forestry residues*. https://authors.elsevier.com/c/1blBf4s9Hv-ZhL

• Current uses + Characterization of the biomass + Establishment of threshold: on-going

• Employment: 18 months postdoc, from initial budget (Karan)
We addressed the following services:
- Aviation
- Food / Feed from residual biomass
- Bio-based materials

We addressed the following technologies:
- Thermochemical conversion of biomass (pyrolysis, gasification, hydrothermal liquefaction)

Two specific cases:
- Local bioeconomy for \( CH_4 \) supply (gasification + AD + biogas/syngas methanation)
- Circular bioeconomy case with a non-edible, non-avoidable food waste

Employment:
- 2 PhDs, both partly funded by the project (Javourez, Su-Ungkavatin)
- 1 postdoc, fully financed by own Excellence grant (Brassard)

Synergies with 3 external PhDs (Teigiserova, Lodato, G-Campos)

Key highlights – RO2
- 2 published papers
- 1 pre-print
- 3 submitted papers
- 7 on-going papers
Key highlights – RO3

- We reviewed the cause-effects relationships of 7 leading prospective studies

- Employment:
  - 1 PhD, partly funded by the project (Lee)
We established a collaboration with AU/CBIO

National case study:
  - We spatially quantified the lands where biopumps could be implemented in France
  - We started 2 LCA case study with 2 crops, and 3 (long-term) bio-based materials (2 on-going papers)
  - We demonstrated the biopump concept and its potential as a climate mitigation / negative emission inducing technology (1 on-going paper)

One spin-off: The H2020 NEGEM project

Employment:
  - 1 PhD, fully funded by own national PhD grant (Shen)
  - [1 postdoc, fully financed by NEGEM (Albers)]

Key highlights – RO4
Key highlights – RO5

- We established a collaboration with INRAE 4p1000 researchers (Launay, Clivot, Théron, Constantin)
- National case study:
  - Baseline 2020 – 2100 established, building on INRAE 4p1000 database. Converting data not so straightforward!
  - On-going review paper
  - Simulations on AMG are starting
- Employment:
  - 1 PhD, fully funded by own national PhD grant (Andrade)
Next steps

• Final optimization platform: how do we allocate all our residual streams & biopumps produced on C-vulnerable lands to the different conversion tech, products, services?
  • Applied for cofunding for a postdoc (Marie Curie COFUND Fellowship)

• Modular database available for all

• Yearly webinar

• ABM / NEGEM meeting in Toulouse and synergies for a spin-off conference

• Final conference

• From a technological to a science project: how to make it happen, considering stakeholders constraints/preferences/perceptions?
Vision for an interactive database:

1. Select residual stream(s)
2. Select administrative region(s)
3. Select administrative department(s)
4. Make choice on Current use, if you want to see LCI or modify it, View Environmental Impact

Visualize resource availability as maps
Visualize resource flows
View resources per administrative region per stream
Cambioscop in the public space (some examples)

- **International events**
  - REPAIR2020
  - EPNOE 2019
  - EUBCE 2019
  - BRC2020

- **National events**
  - JRI 2020

- **Regional events**
  - Forum Economie Circulaire Region Occitanie 2019

- **Our YouTube channel:** [https://www.youtube.com/channel/UCvWM2__5hSWN1zuJ4vEZNA](https://www.youtube.com/channel/UCvWM2__5hSWN1zuJ4vEZNA)

- **Our Twitter account:** @Cambioscop

- **Our website:** [https://cambioscop.cnrs.fr/](https://cambioscop.cnrs.fr/)
Our publications


Thanks for your attention

Cambioscop
Carbon management towards low fossil carbon use

https://cambioscop.cnrs.fr/

Note: all of our data will be publicly available, on the Cambioscop website and/or as SI of our papers and/or as preprints

hamelin@insa-toulouse.fr  @hamelinlab