

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

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Cambioscop Mid-term Webinar • 28.10.2020



Toulouse Biotechnology Institute
Bio & Chemical Engineering



Purpose of today's webinar

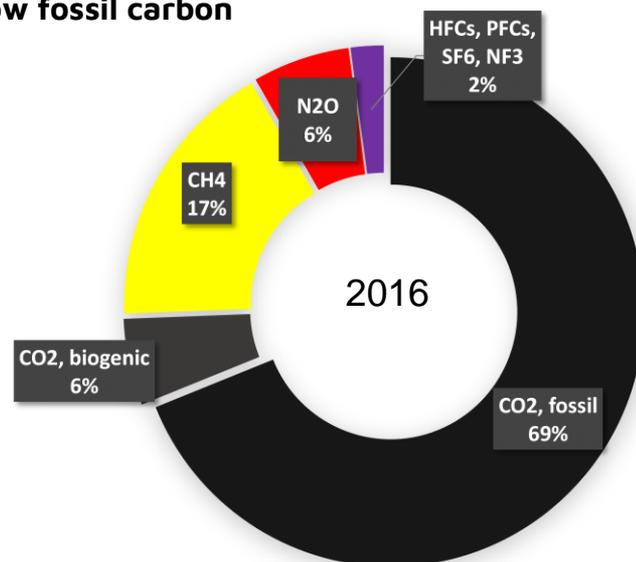
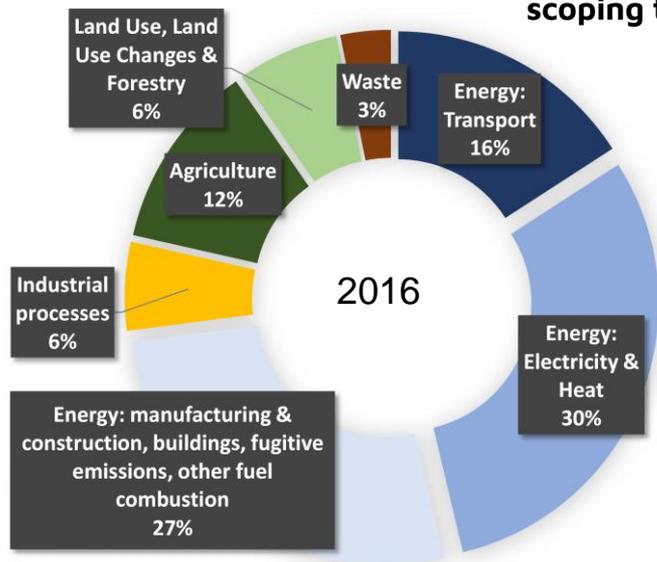
- **Thanks to all of you!**
- **Inform a larger audience on our results**
- **Get your feedback (!)**
 - **This project is for you: We want our results to be useful / usable / used!**

- **Overview of the agenda**
- **Mics (please shut them)**
- **Q&A procedure & chat**

Why Cambioscop?



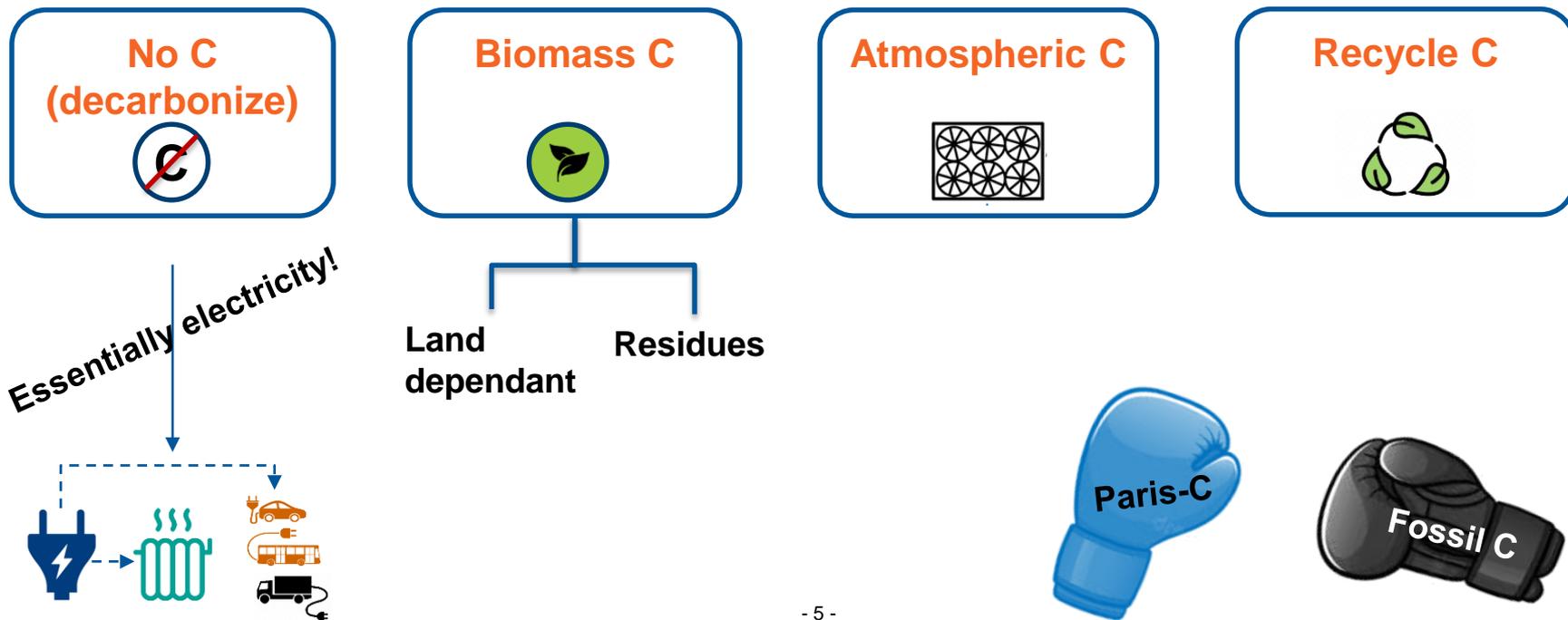
Carbon management & Bioresources strategies for scoping the transition towards low fossil carbon



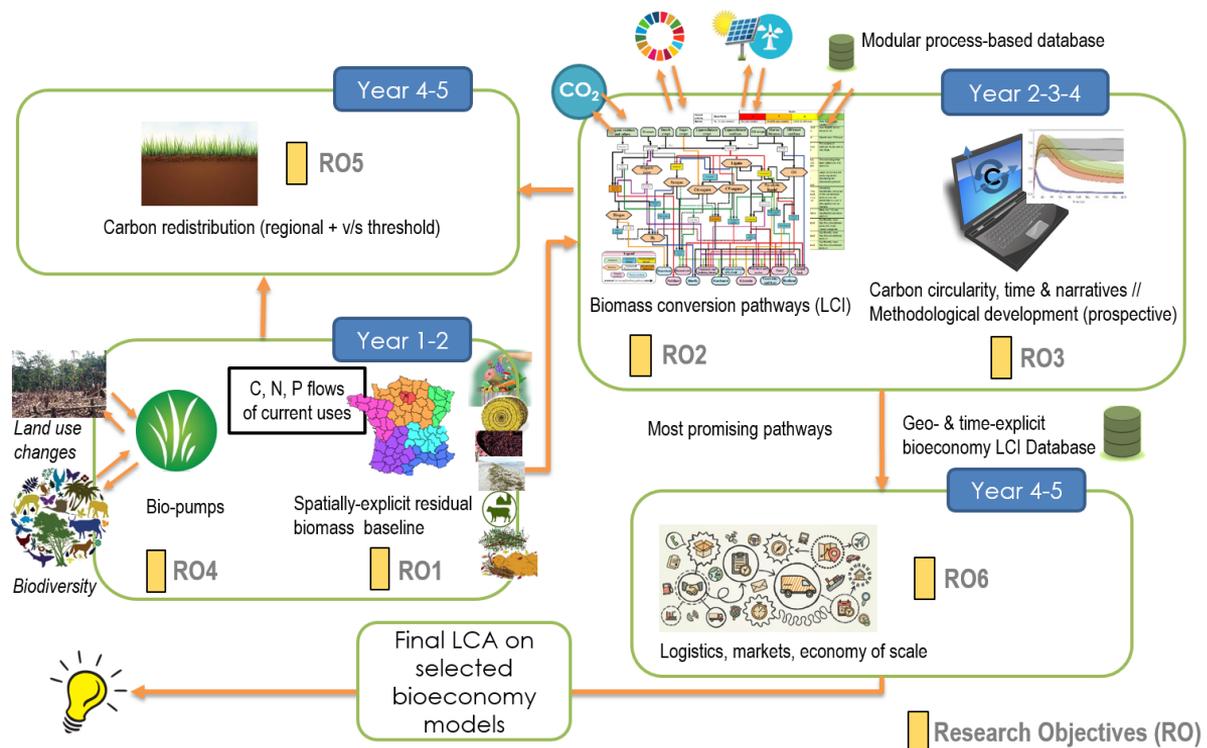
Source: own figures, made from data retrieved from <https://www.wri.org/resources/data-visualizations/world-greenhouse-gas-emissions-2016>

Why Cambioscop?

Routes towards low fossil C



Cambioscop



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French president's climate talent search nabs 18 foreign scientists

By Elisabeth Pain | Dec. 11, 2017, 2:00 PM

Key highlights – R01

- **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/1bIBf4s9Hv-ZhL>
- **Current uses + Characterization of the biomass + Establishment of threshold: on-going**
- **Employment: 18 months postdoc, from initial budget (Karan)**



2 published papers
1 on-going paper

Key highlights – RO2

- **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 CH₄ 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)**



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)



1 on-going paper

Key highlights – RO4

- **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)]**



3 on-going papers

 **NEGEM**



This project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement No. 869192.

Key highlights – R05

- **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)**



2 on-going papers

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?**

Cambioscop in the public space (some examples)

- **International events**

- REPAIR2020
- Our own SustBioEco Conference in Toulouse:
<https://sustbioeco2019.sciencesconf.org/resource/page/id/6>
- EPNOE 2019
- EUBCE 2019
- BRC2020

CIGR 2021

REGATEC
2021

EUBCE 2021

- **National events**

- JRI 2020

- **Regional events**

- Forum Economie Circulaire Region Occitanie 2019

- **Our YouTube channel:**

https://www.youtube.com/channel/UCvWM2__5hSWN1zujJ4vEZNA

- **Our Twitter account: @Cambioscop**

- **Our website: <https://cambioscop.cnrs.fr/>**

Our publications

- 1) Karan SK, Hamelin L (2021). *Crop residues may be a key feedstock to bioeconomy but how reliable are current estimation methods? Resources, Conservation & Recycling*, 164. <https://doi.org/10.1016/j.resconrec.2020.105211>
- 2) Hamelin L, Moller HB, Jorgensen U. Harnessing the full potential of biomethane towards tomorrow's bioeconomy: A national case study coupling sustainable agricultural intensification, emerging biogas technologies and energy system analysis. *Renewable & Sustainable Energy Reviews*. <https://doi.org/10.1016/j.rser.2020.110506>
- 3) Karan SK, Hamelin L (2020). Towards local bioeconomy: A stepwise framework for high-resolution spatial quantification of forestry residues. *Renewable & Sustainable Energy Reviews*, 134. <https://doi.org/10.1016/j.rser.2020.110350>
- 4) Karan SK, Hamelin L (2021). *Crop residues may be a key feedstock to bioeconomy but how reliable are current estimation methods? Resources, Conservation & Recycling*, 164. <https://doi.org/10.1016/j.resconrec.2020.105211>
- 5) Hansen JH, Hamelin L, Taghizadeh-Toosi A, Olesen JE, Wenzel H (2020). Agricultural residues bioenergy potential that sustain soil carbon depends on energy conversion pathways. *Global Change Biology Bioenergy*. <https://doi.org/10.1111/gcbb.12733>
- 6) Teigiserova D, Hamelin L, Thomsen M (2020). Towards transparent valorization of food surplus, waste and loss: Clarifying definitions, food waste hierarchy, and role in the circular economy. *Science of the Total Environment*, 706, 136033. <https://doi.org/10.1016/j.scitotenv.2019.136033>
- 7) Teigiserova D, Hamelin L, Thomsen M (2019). Review of high value food waste and food residues biorefineries with focus on unavoidable waste from processing. *Journal of Resources, Conservation and Recycling*, 149, 413-426. <https://doi.org/10.1016/j.resconrec.2019.05.003>
- 8) Hamelin L, Borzecka M, Kozak M, Pudelko R (2019). A spatial approach to bioeconomy: quantifying the residual biomass potential in Europe. *Renewable & Sustainable Energy Reviews*, 100, 127-142. <https://doi.org/10.1016/j.rser.2018.10.017>
- 9) Brassard P, Godbout S, Hamelin L. (2020). Framework for consequential life cycle assessment of pyrolysis biorefineries: A case study for the conversion of primary forestry residues. Earth ArXiv Preprint: <https://doi.org/https://doi.org/10.31223/osf.io/3qfc4>

Thanks for your attention



<https://cambioscop.cnrs.fr/>



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

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