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# The circular business case

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Exploring the role of the business case in creating financially feasible and circular biobased housing developments

P5 Presentation | Arthur Knibbe (4869427) 21 June 2023



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# TABLE OF CONTENTS

1.

Introduction &  
problem statement

2.

Research questions

3.

Research methods

4.

Research output

5.

Key takeaways  
from literature

6.

Results

7.

Conclusion

8.

Discussion

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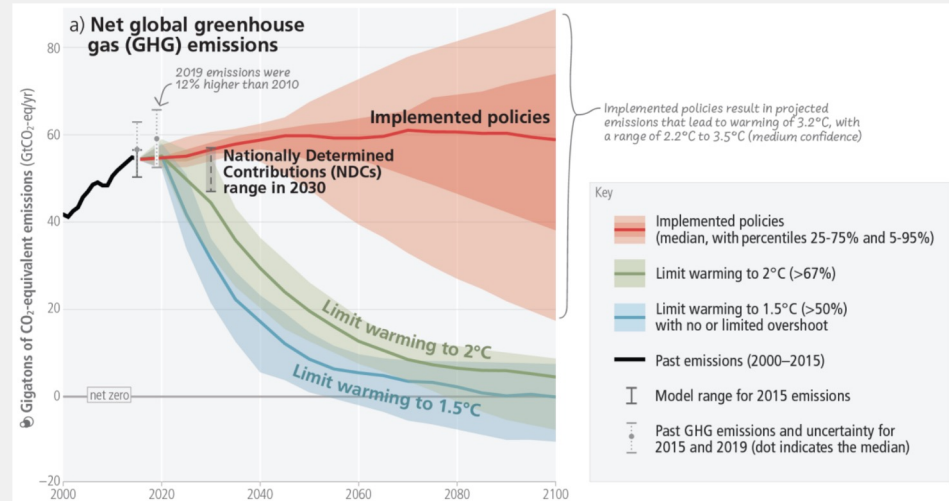
# Introduction & problem statement

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# 1. Introduction & problem statement

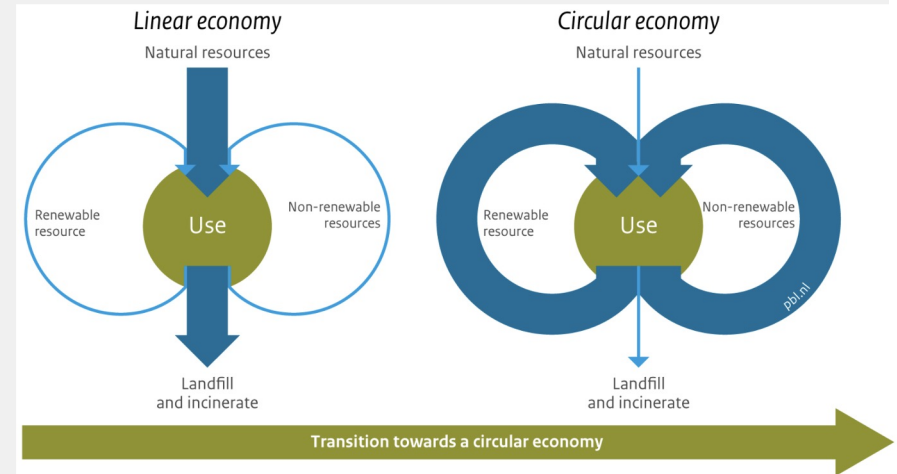
- Impact building industry
- Climate change
- Immediate action required



Source: IPCC (Intergovernmental Panel on Climate Change) (2023)

# 1. Introduction & problem statement

- Linear vs circular economy
- NL circular & energy neutral by 2050
- From problem to solution
  - Biobased construction as circular strategy



Source: Potting et al. (2017)

# 1. Introduction & problem statement

## However:

- Lacking
- Early stage
- Small market share
- Financial feasibility struggles

➔ Reasons for concern



Source: [boldbusiness.com](https://boldbusiness.com) (2019)

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**Research  
questions**

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## 2. Research questions

### Main research question:

How are **business cases** adapted in order to create **financially feasible** and **circular biobased housing** developments?

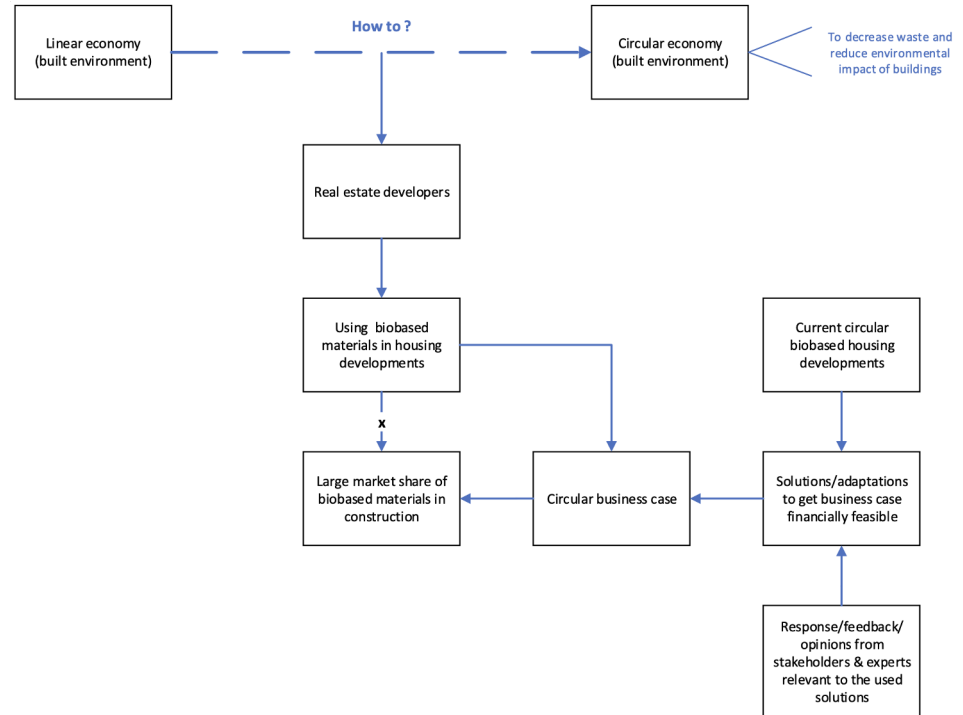
### Sub-questions:

1. What does the **circular economy** entail, specifically within the **built environment**?
2. How does a **developer** and its **business case** for a **real estate development** work?
3. How are **biobased housing projects** currently being developed?
4. What is the **influence** of these **implementations** on the business case?
5. To what extent are the **changes** made in the business case a **solution**?



## 2. Research focus & aim

- Transition
  - Developers
  - Current developments
  - Business case
- Solid, healthy?



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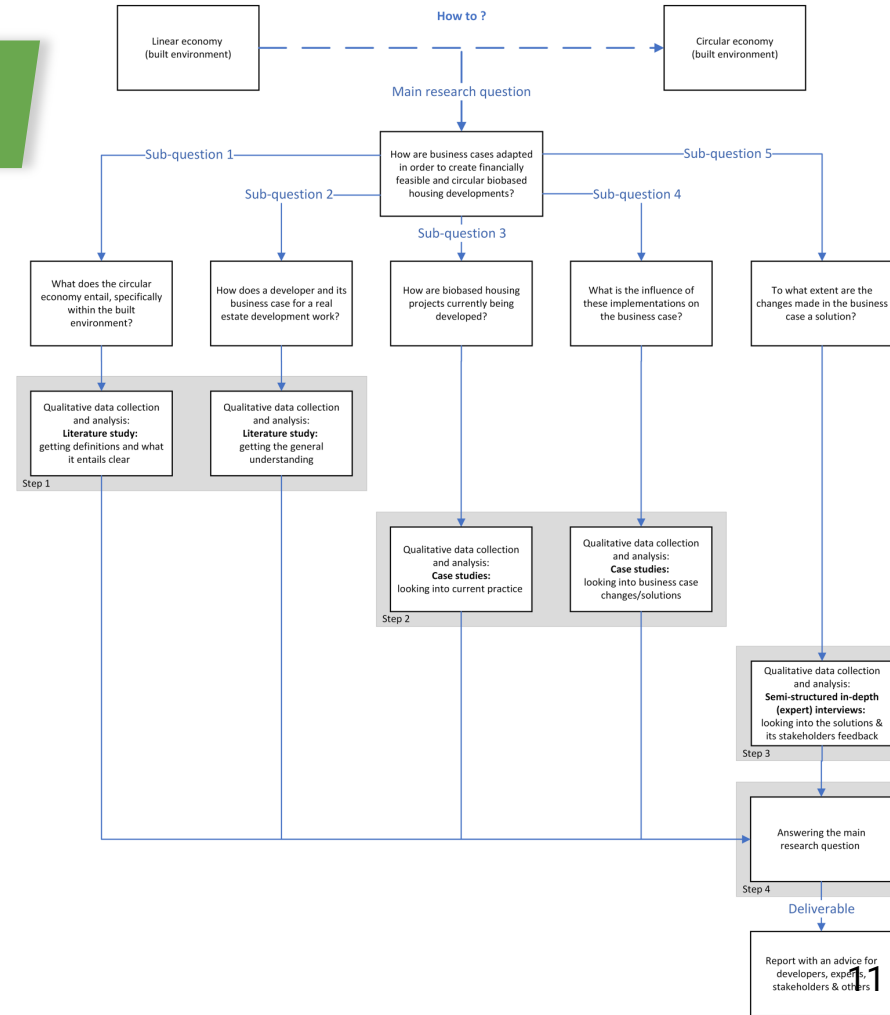
# Research methods

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3

# 3. Research methods

- Exploratory & qualitative research
- Four steps
  - Step 1: SQ 1 & 2
  - Step 2: SQ 3 & 4
  - Step 3: SQ 5
  - Step 4: main research question



4

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**Research  
output**

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# 4. Research output

- Main goal/objective: transition in building industry
- Deliverables:

## Advice Report



CE descriptions



Current practice,  
complications & opportunities



Stakeholders



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# Key takeaways from literature

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# 5. Key takeaways from literature

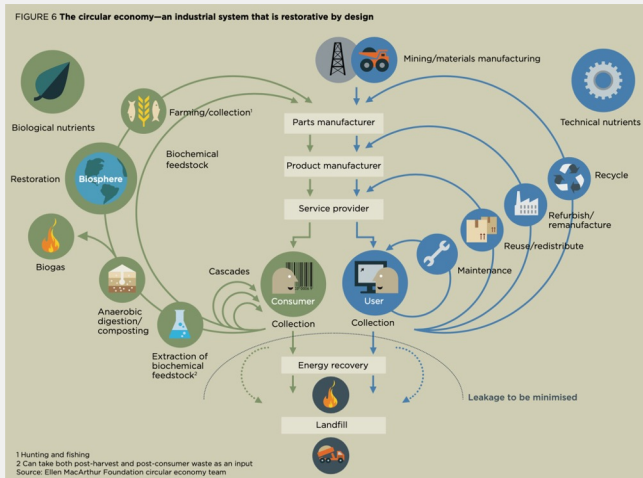
- Literature study: SQ 1 & 2
  - Empirical research

**SQ 1.** What does the **circular economy** entail, specifically within the **built environment**?

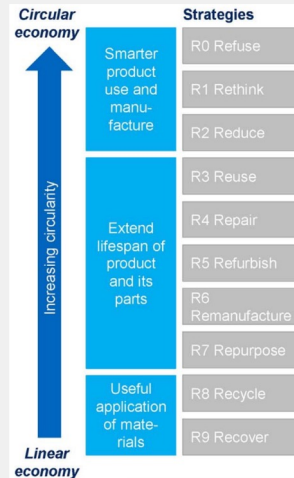
**SQ 2.** How does a **developer** and its **business case** for a **real estate development** work?

# 5. Key takeaways from literature

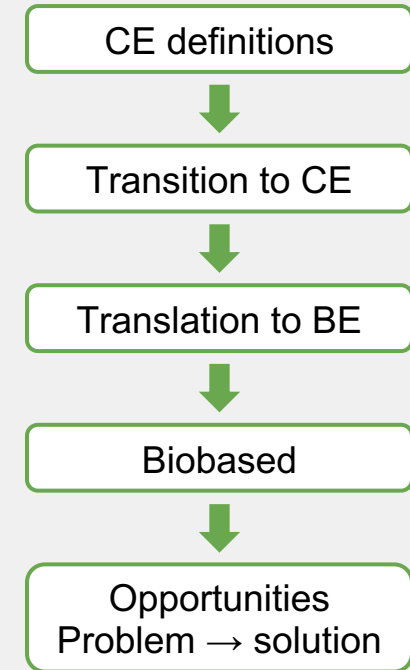
- Focus & scope
- EMF most well-known
- From 'take-make-waste' to 'design-use-recover'



Source: EMF (2013)



Source: Kirchherr et al. (2017)





# 5. Key takeaways from literature

- Important market party
- Parameter
- Costs barrier in business case
- MPG

Housing typology	MPG-improvement [%]	Increase direct building costs [%]
Home S (between)	-38%	+16%
Home M (between)	-38%	+24%
Home M (corner)	-41%	+24%
Home L (detached)	-43%	+23%
Residential building M	-28%	+32%
Residential building XL	-32%	+18%

Source: Alba Concepts (2022)

6

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**Results**

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# 6. Results: case studies

- Empirical research part 1
  - Case studies

**SQ 3.** How are **biobased housing projects** currently being developed?

**SQ 4.** What is the **influence** of these **implementations** on the business case?

# 6. Results: case studies

- 7 case studies
  - 7 housing developments
- 10 interviewees
  - Semi-structured in-depth interviews



Source: [bolwerkweekers.nl](http://bolwerkweekers.nl) (2022)

# 6. Results: case studies

1. Xylino



2. Swanladriehoek



3. HAUT



4. Horizons



5. SAWA



6. De Nieuwe Es

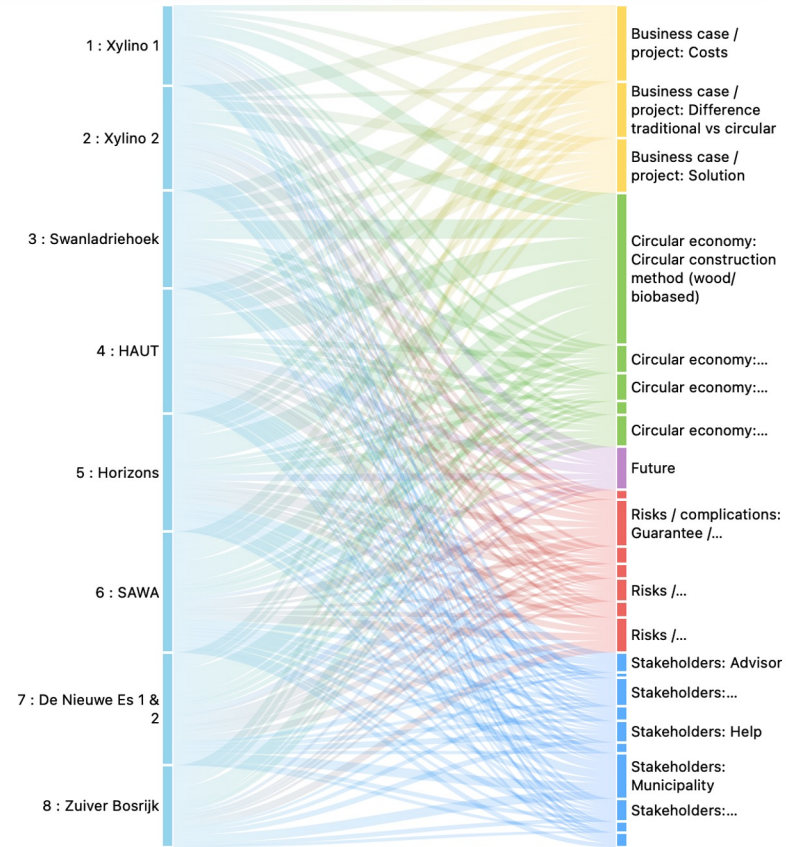


7. Zuiver Bosrijk



# 6. Results: case studies

- Coding with Atlas TI
  - 5 main themes related to:
    - Business case / project
    - Circular economy
    - Future
    - Risks / complications
    - Stakeholders
  - 26 sub-themes
- Identify & compare



# 6. Results: case studies

- Building methods
  - Modular concept homes
  - Hybrid construction
  - CLT, wood frame construction, bamboo
  - Mixed construction



Source: houtbaar.nl (2021)



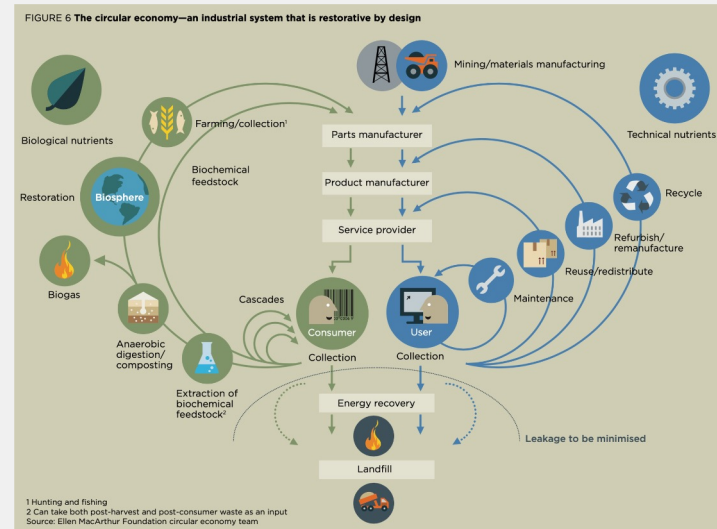
Source: bolwerkweekers.nl (2022)



Source: mei-arch.eu (n.d.)

# 6. Results: case studies

- Circular
- Project establishment
- Circular vs traditional
- Low-rise vs high-rise



Source: EMF (2013)



# 6. Results: case studies

- 'Solutions' / adaptations
  - Less/no profit
  - Hybrid & mixed construction
  - Land price & tender shift
  - Subsidy (MIA Vamil regulation)
  - Selling construction stored carbon
- Future



Source: [mei-arch.eu](http://mei-arch.eu) (n.d.)

# 6. Results: case studies

- Overview:

Project:	Xylino	Swanladriehoek	HAUT	Horizons	SAWA	De Nieuwe Es	Zuiver Bosrijk
<b>Monetary aid:</b>							
<b>Lower land price</b>	yes	no	no	no	yes	no	yes
<b>Investor/buyer paid more</b>	yes	not sold yet	yes	not sold yet	yes	not discussed in interview	yes
<b>Cut in own profit</b>	yes	not sold yet	yes	not sold yet	yes	yes	yes
<b>Other</b>	MIA subsidy	not all homes biobased	-	-	sold construction stored carbon credits	not all homes biobased & MIA subsidy	-



Focus for part 2 of empirical research

# 6. Results: stakeholder interviews

- Empirical research part 2
  - Interviews

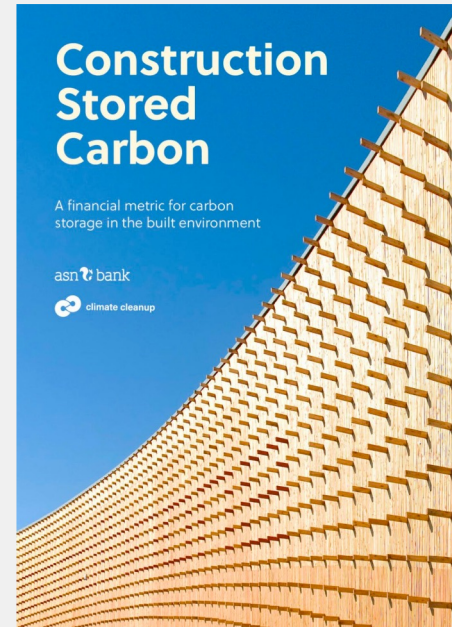
**SQ 5.** To what extent are the **changes** made in the business case a **solution**?

# 6. Results: stakeholder interviews

<b>Interviewee:</b>	<b>Topic:</b>	(Decentralised) government aid	Selling CO2 credits & valuing stored carbon	Biobased construction (opportunities, barriers & costs)
Built by Nature		✓	Main focus	Main focus
Klimaatverbond		Main focus	✓	✓
Province of Utrecht		Main focus	✓	✓
Climate Cleanup		✓	Main focus	✓
Biobased expert		✓	✓	✓
Graduate/developer		✓	Main focus	✓
Municipality of Amsterdam		Main focus	✓	✓
Municipality of Utrecht		Main focus	✓	✓
Triodos Bank		✓	✓	✓
Alba Concepts		✓	✓	Main focus

# 6. Results: stakeholder interviews

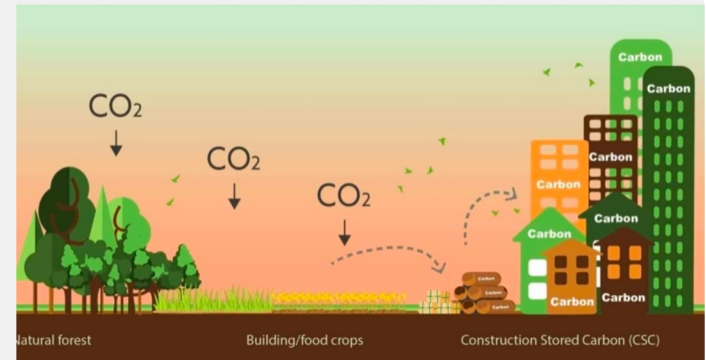
- Built by Nature
- Klimaatverbond Nederland
- Climate Cleanup
- Alba Concepts



Source: [climatecleanup.org](https://climatecleanup.org) (2021)

# 6. Results: stakeholder interviews

- Problem → solution
- Together
- CO2 pricing
- Construction stored carbon credits
  - **ONCRA** (Open Natural Carbon Removal Accounting)
- Fictitious & real cash flows



Source: [biobasedbouwen.nl](http://biobasedbouwen.nl) (n.d.)

# 6. Results: stakeholder interviews

- Temporary
- Emergency measures
- Not fitted
  - Aspects missing
  - TCO, LCC
  - Investors
- Building methods
- Circular
  - Now & future



Source: [truestqs.com](http://truestqs.com) (n.d.)

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# Conclusion

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7



# 7. Conclusion

## Main research question:

How are **business cases** adapted in order to create **financially feasible** and **circular biobased housing** developments?

# 7. Conclusion

- Business cases not drastically changed
- Adaptations/measures
- Limits wider/larger transition
- Support
- Traditional business case does not work for biobased as circular strategy
  - Changes needed
  - Input/output

# 8

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# Discussion

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# 8. Discussion

- Paradigm shift
- Different views
- Economic system
- Changes needed

# 8. Limitations

- Time
- Stakeholders
- Case studies
- Other strategies



Source: [arcam.nl](http://arcam.nl) (2021)

# 8. Recommendations

- For future research
  - Long-term thinking
  - Investor
  - User experience
- For practice
  - Materials
  - Building methods



Source: [bolwerkweekers.nl](https://bolwerkweekers.nl) (2022)

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# Thank you

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Are there any questions?