

WOOD-POLYMER COMPOSITE - A STEP TOWARDS CIRCULAR ECONOMY?

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How may the production of wood-polymer composite contribute to the circular economy objectives?

Said in Closing the loop - An EU action plan for the Circular Economy

recycling is a precondition for a circular economy

increasing plastic recycling is essential for the transition to a circular economy

smart design and proper sorting can increase the recycling rates of plastics and avoid landfilling, incineration and use of virgin materials

wood, can be used in multiple ways, and reuse and recycling can take place several times

WPC applications



Source: ArchiExpo, 2016.
<http://www.archiexpo.com/prod/rockwool-bv-rockpanel-group/product-64170-396854.html>



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Content

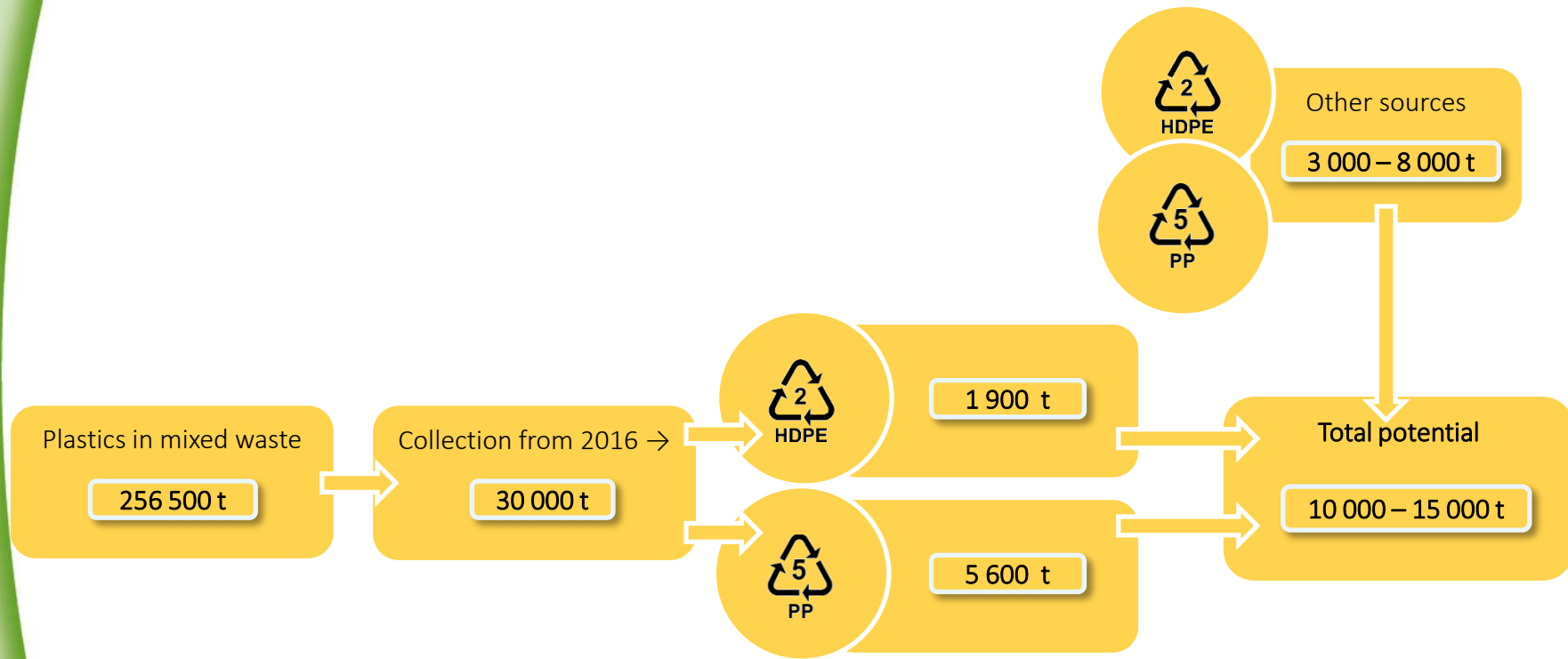
- The flows of municipal plastic waste in the Finnish society
- Life cycle of wood-polymer composite (WPC)
- Scenarios and end-of-life
- Preliminary results of environmental performance
- Hazardous substances –related risks relevant for WPC

potential

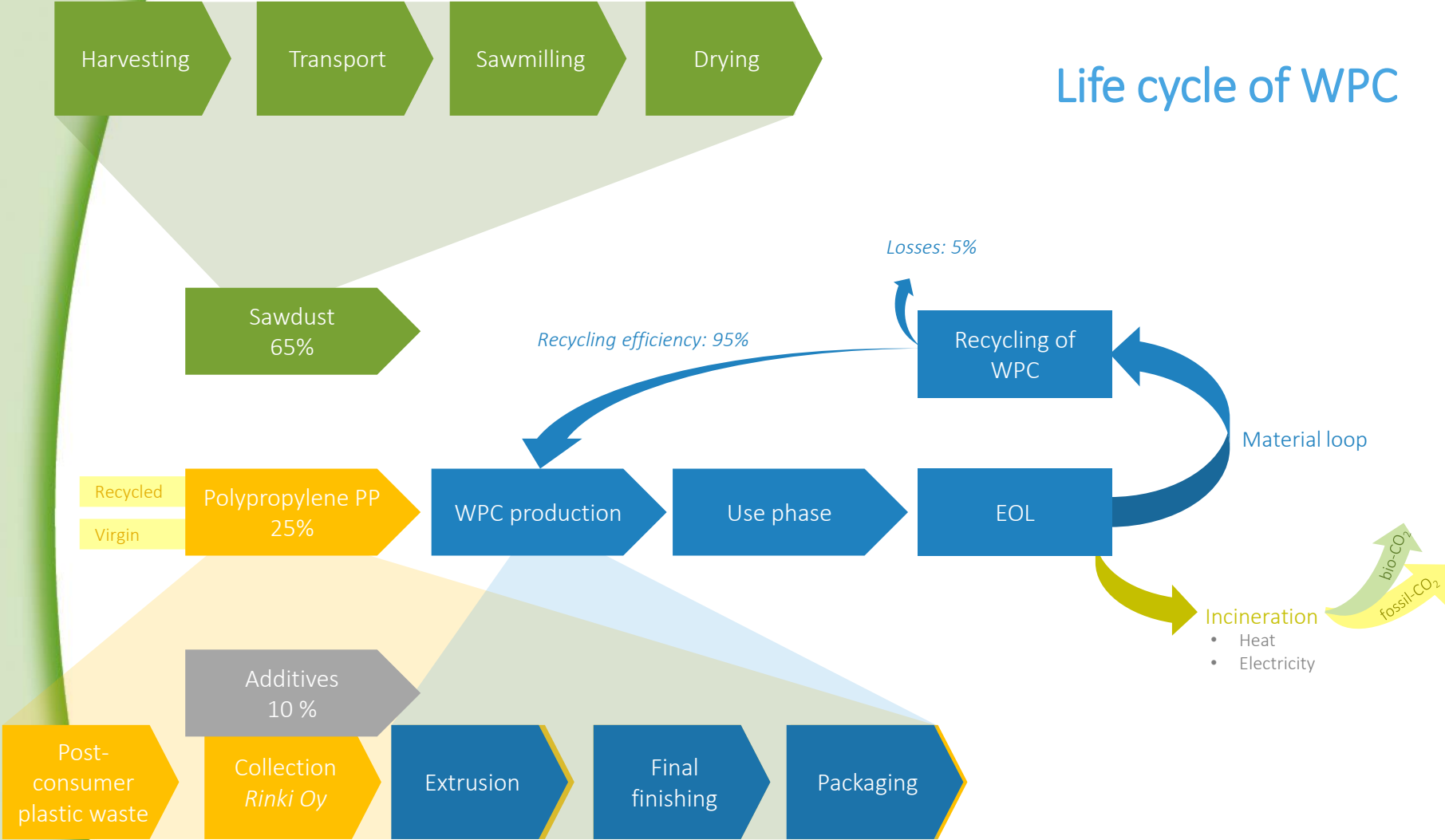
environmental
impacts

obstacles
risks

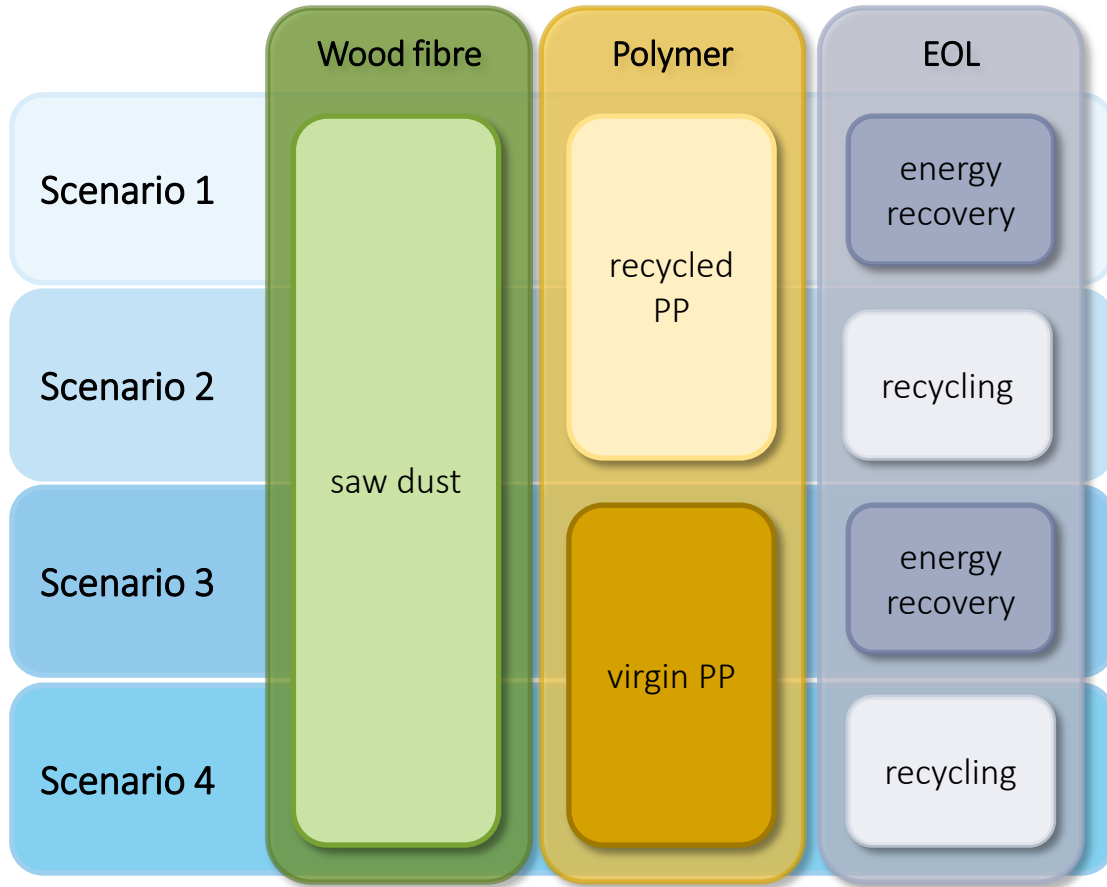
Potential of HDPE and PP flows from 2016 onwards in Finland



Life cycle of WPC

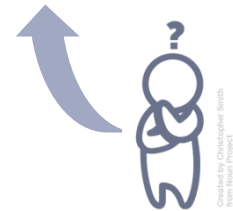
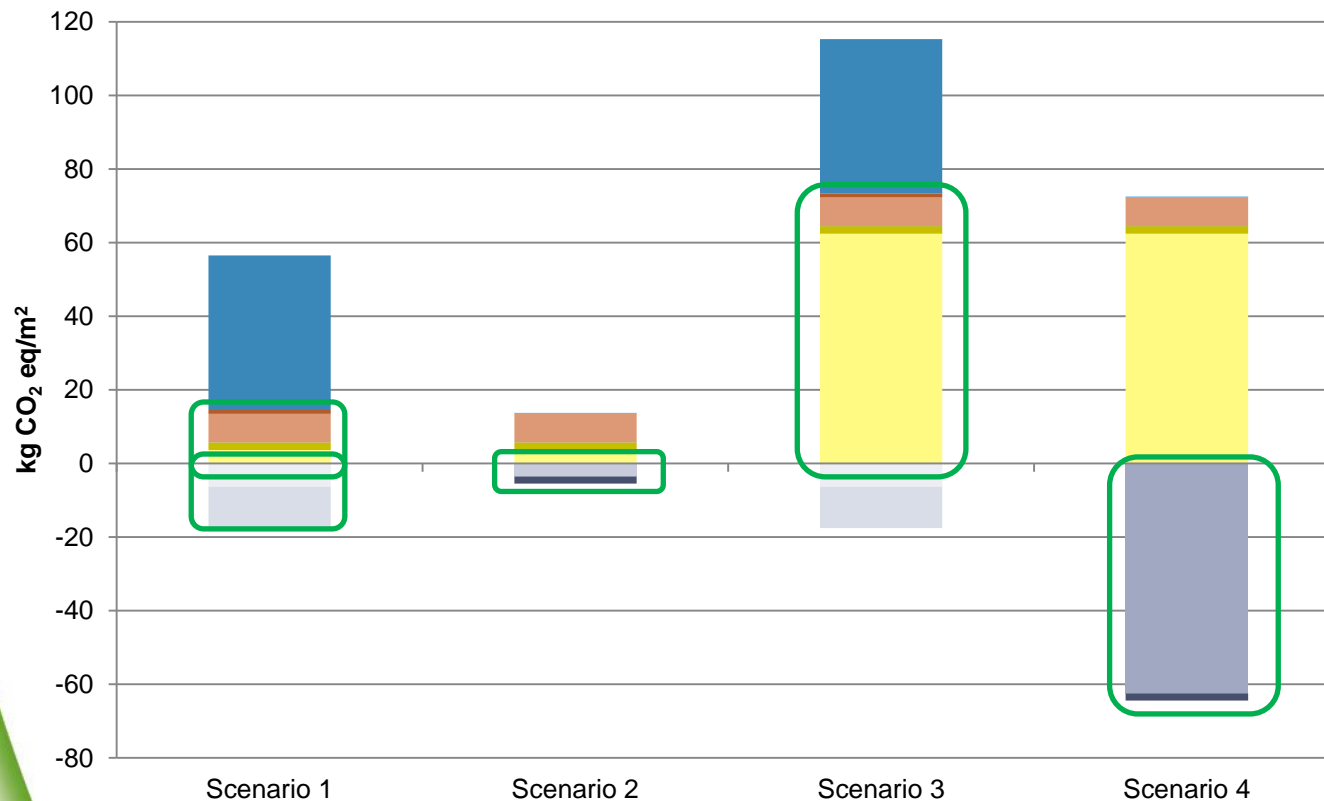


Scenarios



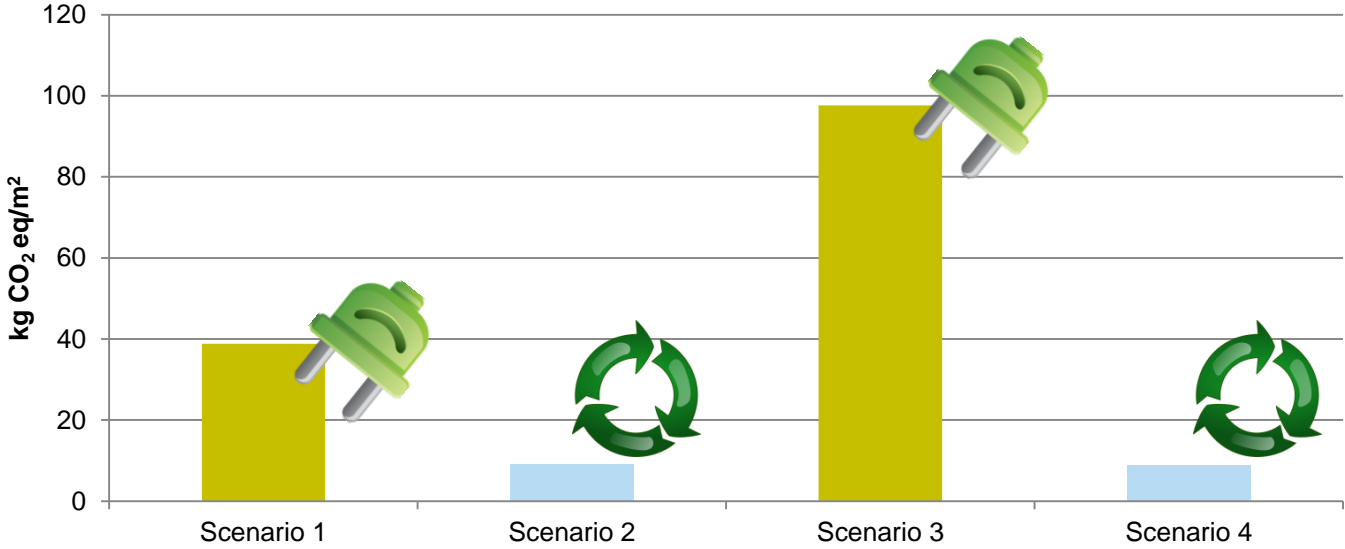
Climate impacts (preliminary results)

- | | | | |
|---------------|-----------------------------|----------------|---|
| Inputs | Energy and transport | EOL | Avoided impacts |
| ■ additives | ■ transport and delivery | ■ incineration | ■ avoided wood fibre |
| ■ wood fibre | ■ formulation & extrusion | ■ recycling | ■ avoided virgin polymer |
| ■ polymers | | | ■ avoided recycled polymer |
| | | | ■ avoided electricity production |
| | | | ■ avoided heat production (wood pellet) |



Dealing with avoided impacts is a subject of further research.

Net climate impacts (preliminary results)



Hazardous substances in WPC

- Raw materials
 - Recycled plastics
 - May contain a broad variety of hazardous substances e.g. phase-out chemicals
 - Critical factors: Origin, waste management and pretreatment
 - Wood
 - No significant hazardous substances
- Production of WPC
 - Added chemicals (comparison of alternatives)
- Release of hazardous substances to the environment upon the use of the end-product

Conclusions

- Multiple recycling cycle of WPC as new composite could lead towards CE
- Challenges for waste management and recycling of WPC because of long life time
- Have to consider the release of hazardous substances to the environment upon the use of the end-product
- Source separation of plastic waste increase the plastics available for WPC production
 - Plastics 10 000 t/year → Terrace (size of 10 m²) 1 600 000 m²
→ New terraces for 30 % of Finnish cottages

Thank you!

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