



Using wood residues for energy as part of a bioeconomy transition

Project overview

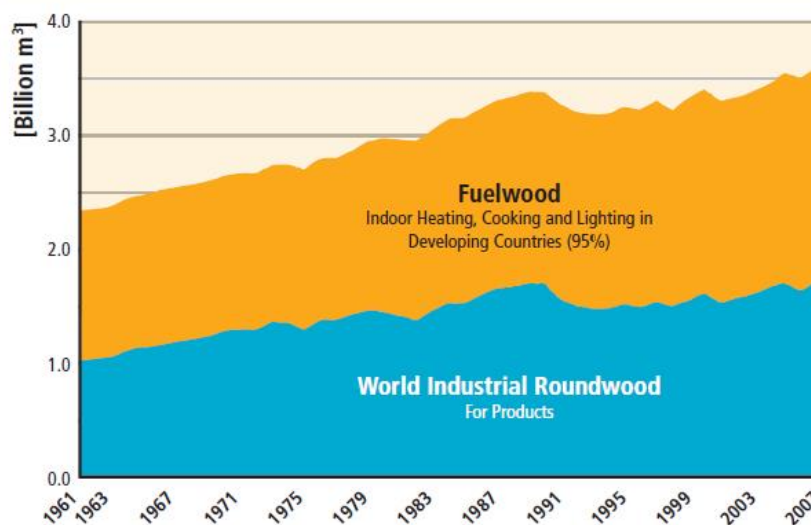
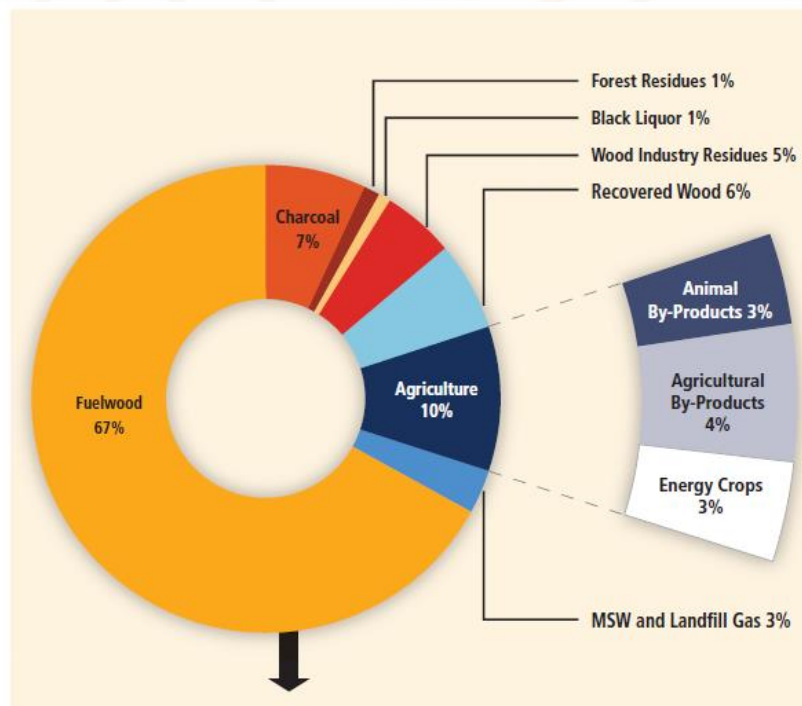


Global shares of biomass sources for energy



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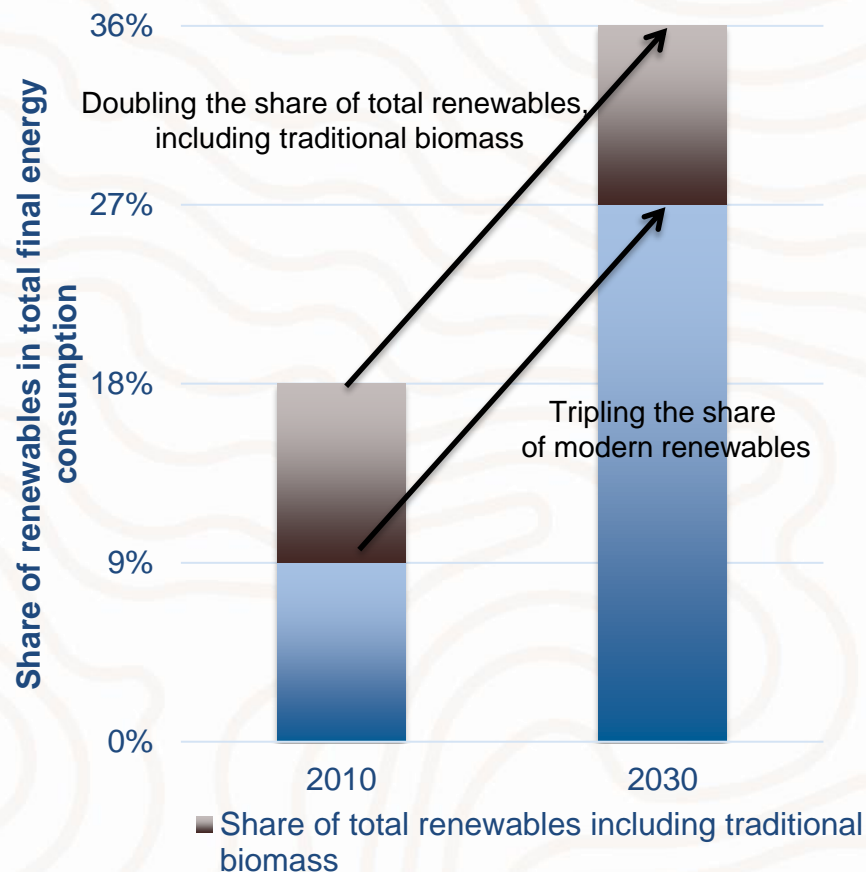
Role of bioenergy in future global energy supply: Renewable Energy Roadmap 2030



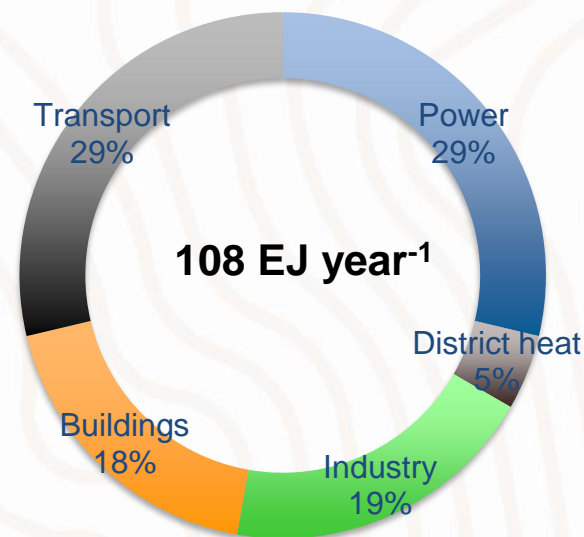
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Target for renewable energy in 2030



Target for bioenergy in 2030



IRENA (2014a, 2014b)

Stages of commercial development of biomass conversion pathways



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	Type of Plant	Type of Product	Stage of Development of Process for Product(s) or System(s)			
			Basic and Applied R&D	Demonstration	Early Commercial	Commercial
Low Moisture Lignocellulosic		Densified Biomass	Torrefaction	Hydrothermal Oil (Hy Oil)	Pyrolysis Oil (Py Oil)	Pelletization
		Charcoal	Pyrolysis (Biochar)			Carbonization
		Heat	Small Scale Gasification			Combustion Stoves
			Combustion	Py/Hy Oil		Home/District/Industrial
		Power or CHP	Combustion Coupled with	Stirling Engine	ORC ¹	Steam Cycles
			Co-Combustion or Co-Firing with Coal	Indirect	Parallel	Direct
			Gasification (G) or Integrated Gasification (IG)	IG-Fuel Cell IG-Gas Turbine		G and Steam Cycle
				IG-Combined Cycle		
		Wet Waste	Heat or Power or Fuel	Anaerobic Digestion to Biogas		
2-Stage				Landfills (1-Stage)		
Microbial Fuel Cell	Reforming to Hydrogen (H ₂)			Small Manure Digesters		
Biogas Upgrading to Methane						
Sugar or Starch Crops		Hydrothermal Processing to Oils or Gaseous Fuels				
		Sugar Fermentation	Butanol	Ethanol		
Oils Vegetable or Waste	Fuels	Microbial Processing ²				
		H ₂	Gasoline/ Diesel/ Jet Fuel	Biobutanol/Butanols ³		
		Extraction and Esterification			Biodiesel	
		Extraction and Hydrogenation			Renewable Diesel	
		Extraction and Refining			Jet Fuel	

Conversion pathways for woody biomass are technologically and commercially mature



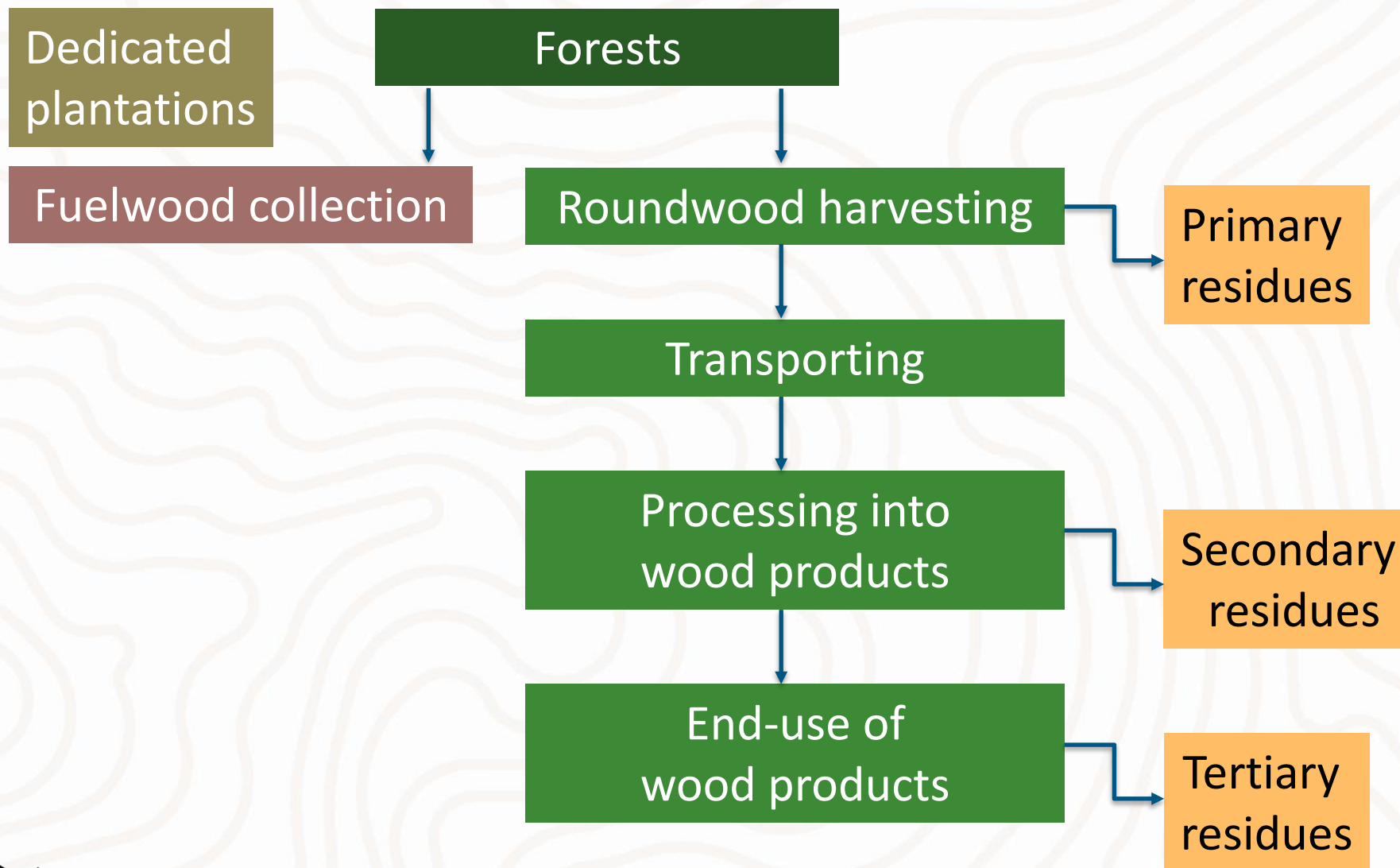
Chum et al. (2011, p.239)

Categories of woody biomass



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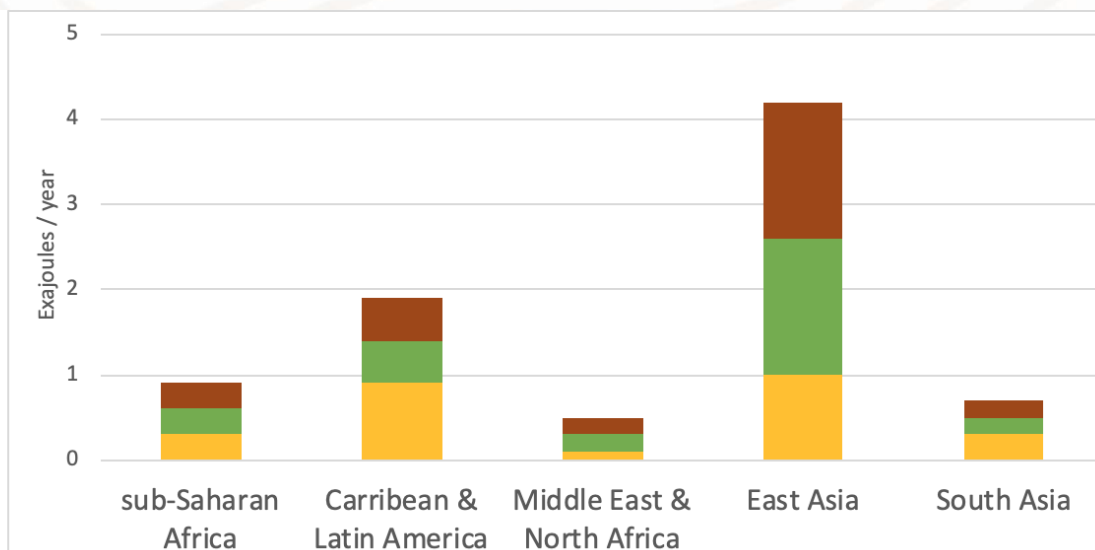
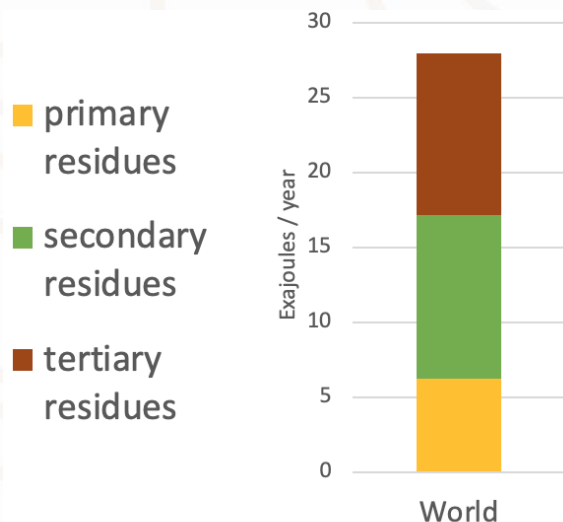
Potential of wood residues for modern bioenergy



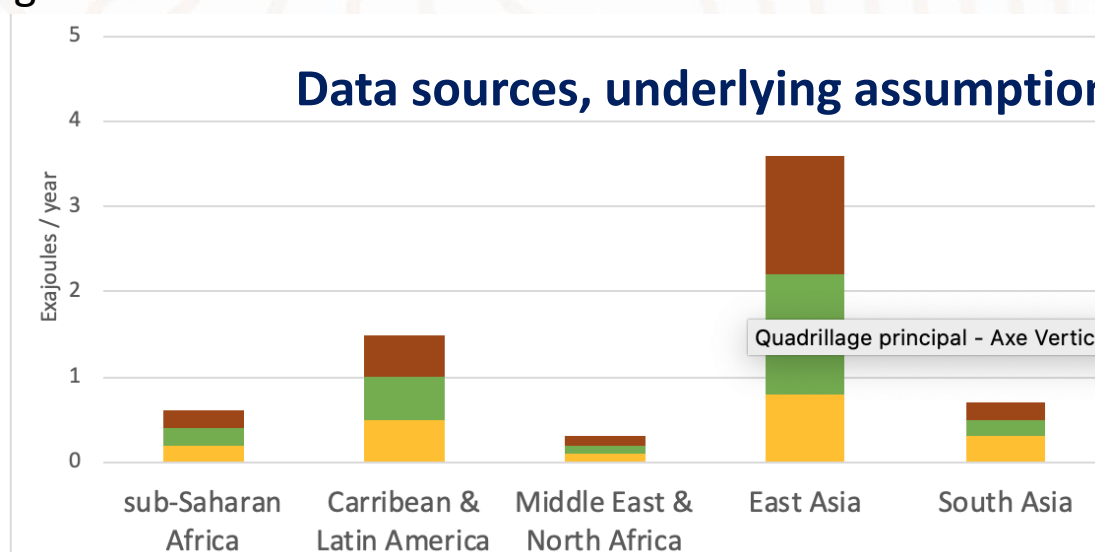
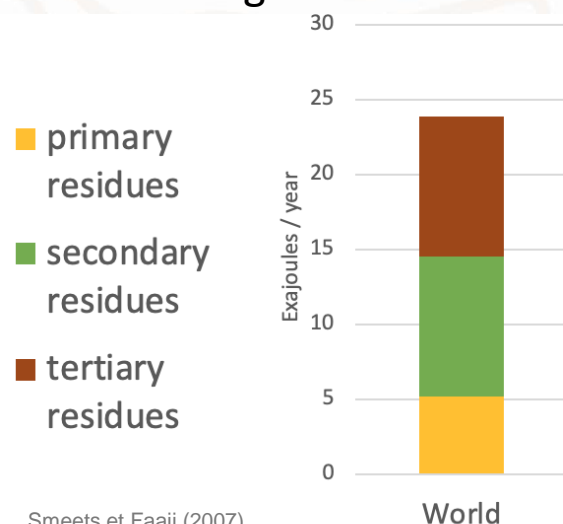
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Theoretical potential



Potential taking into account ecological and economical constraints



The use of secondary residues: Example from Ghana

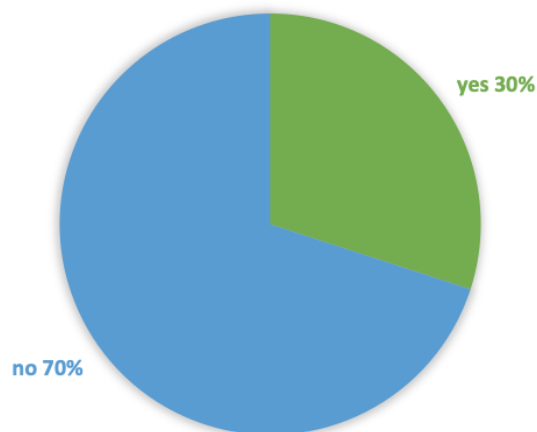


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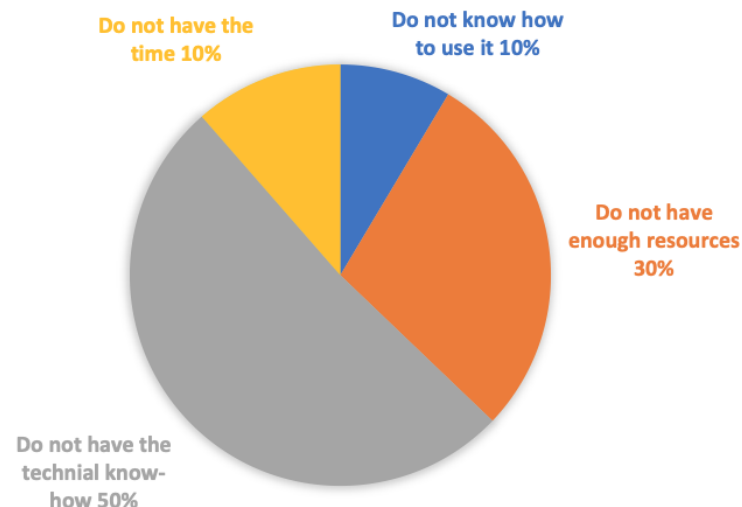
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Survey of 50 wood processing facilities

IS YOUR WOOD PROCESSING FACILITY USING ITS
SECONDARY RESIDUES FOR OTHER PRODUCTS?



WHAT ARE THE MAIN OBSTACLE PREVENTING
THE USE OF SECONDARY RESIDUES?



**How can we ensure technological learning in
the context of developing countries?**

- learning-by-searching
- learning-by-doing
- learning-by-using
- learning-by-interacting



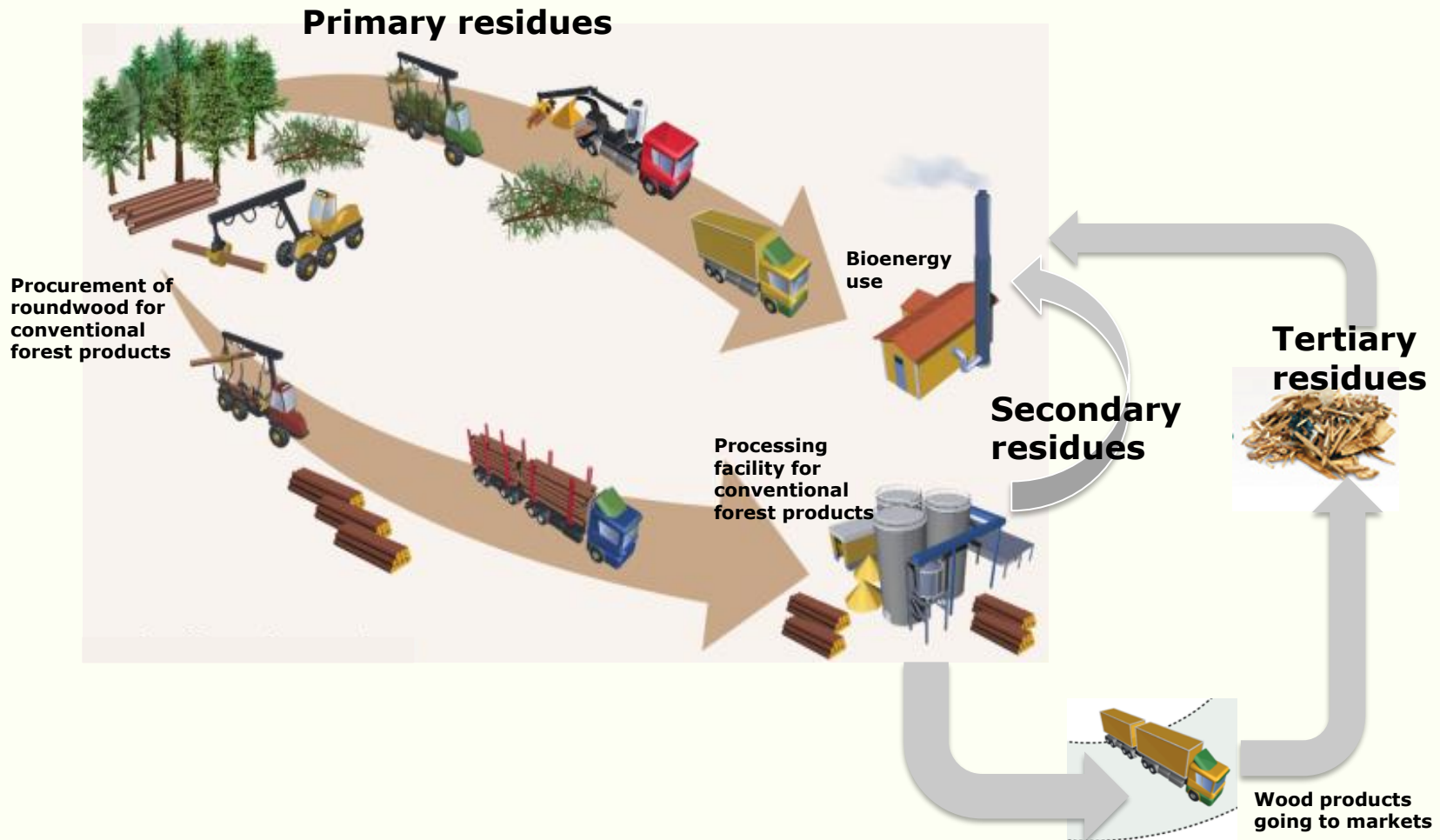
Asamoah et al. (2020)

Wood residue supply chain, basic version



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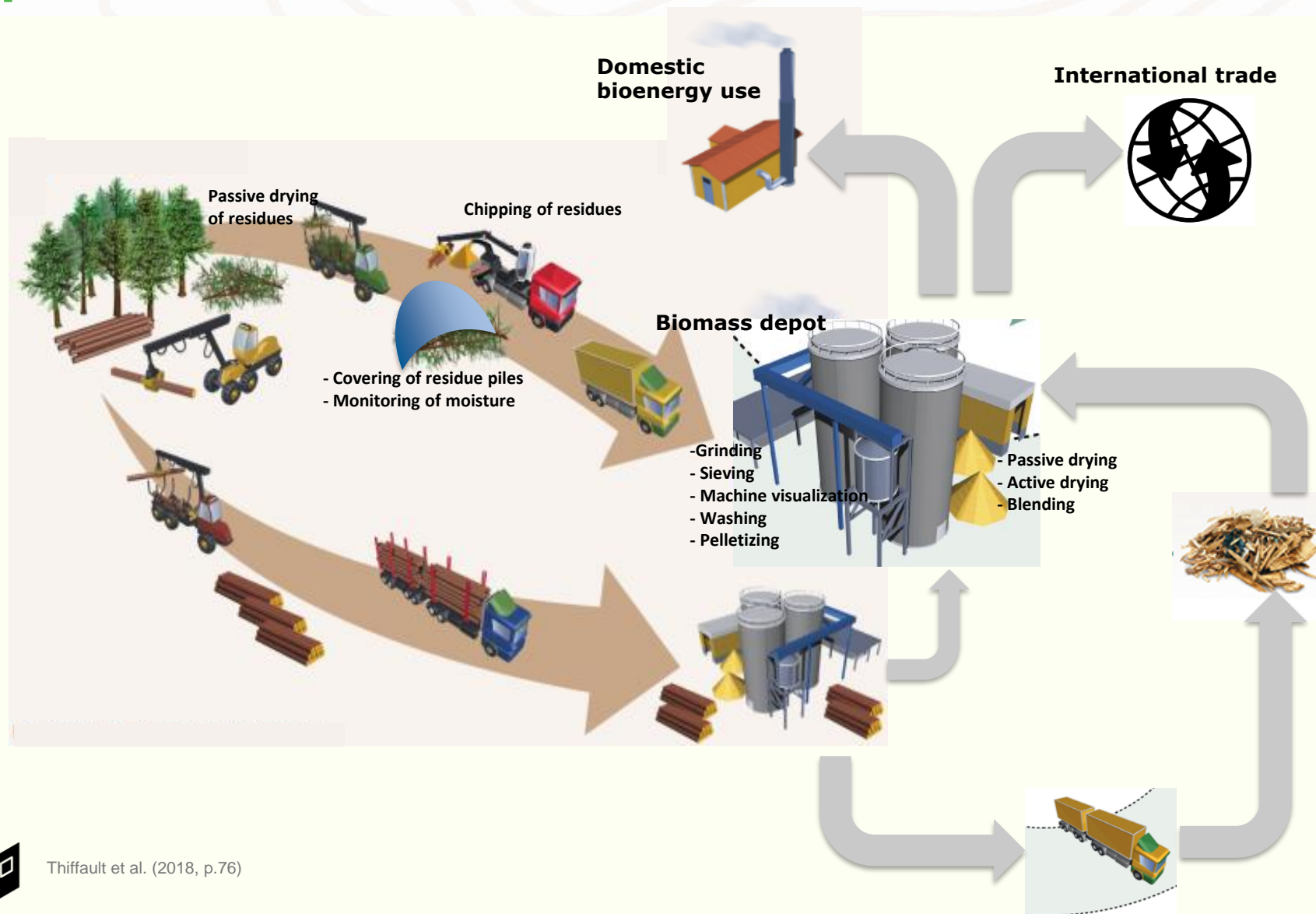


Wood residue supply chain, optimized version



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Example from Canada



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BC LOCAL NEWS



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Aerial view of logs awaiting processing into pellets in Smithers. A new study says logs that could be used elsewhere are instead being ground up for pellets. (Photo Stand.earth)

Pellet producers defend raw material use

Accused of using sawlogs

Apr. 21, 2021 12:00 a.m. / NEWS



Pellet producers are defending themselves against accusations they're grinding up whole logs that have better use elsewhere and, when subsequently burned as pellets, add to greenhouse gas emissions.

How can we ensure monitoring and traceability in the context of developing countries?



BC Local News (2021)

Example from Canada



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La Tuque, northern Quebec



How can we take into account the complexity of socio-economic systems in the context of developing countries?



How can the mobilization of wood residues for energy contribute to sustainable development?



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**SUSTAINABLE
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17 GOALS TO TRANSFORM OUR WORLD



References



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