



Using wood residues for energy as part of a bioeconomy transition

Project overview

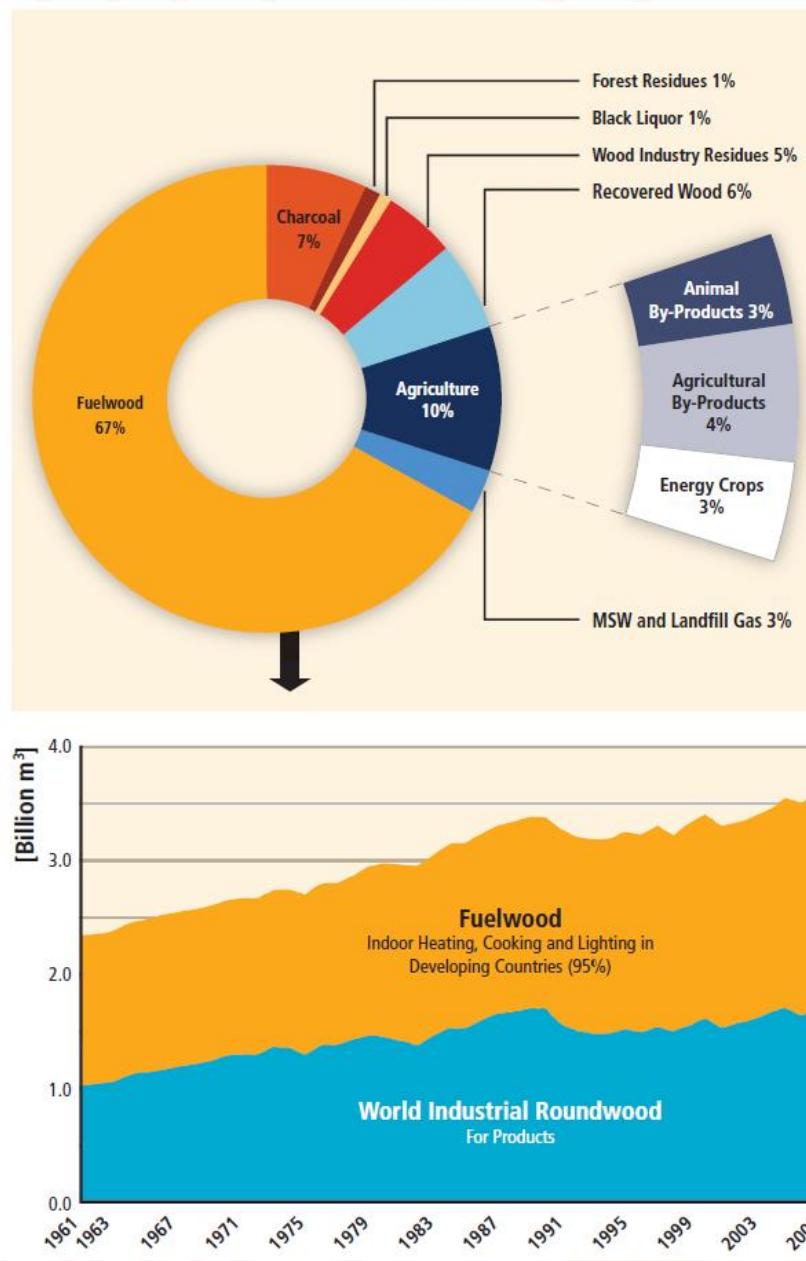


Global shares of biomass sources for energy



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Organization of the
United Nations

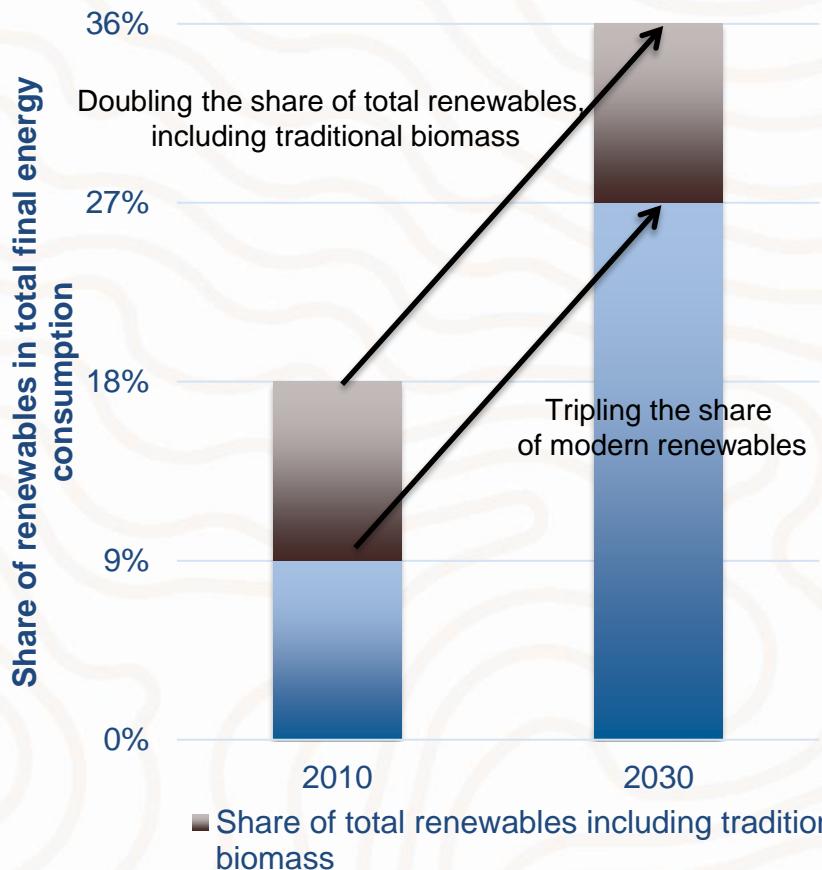
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ON SUSTAINABLE
FOREST-BASED
INDUSTRIES (ACSFI)



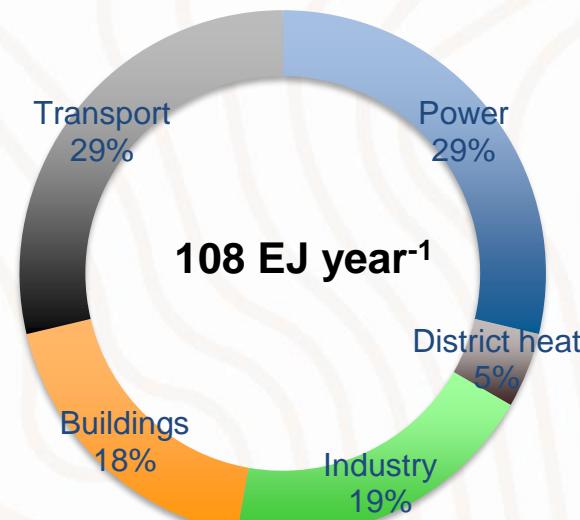
Chum et al. (2011, p.217)

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

Target for renewable energy in 2030



Target for bioenergy in 2030



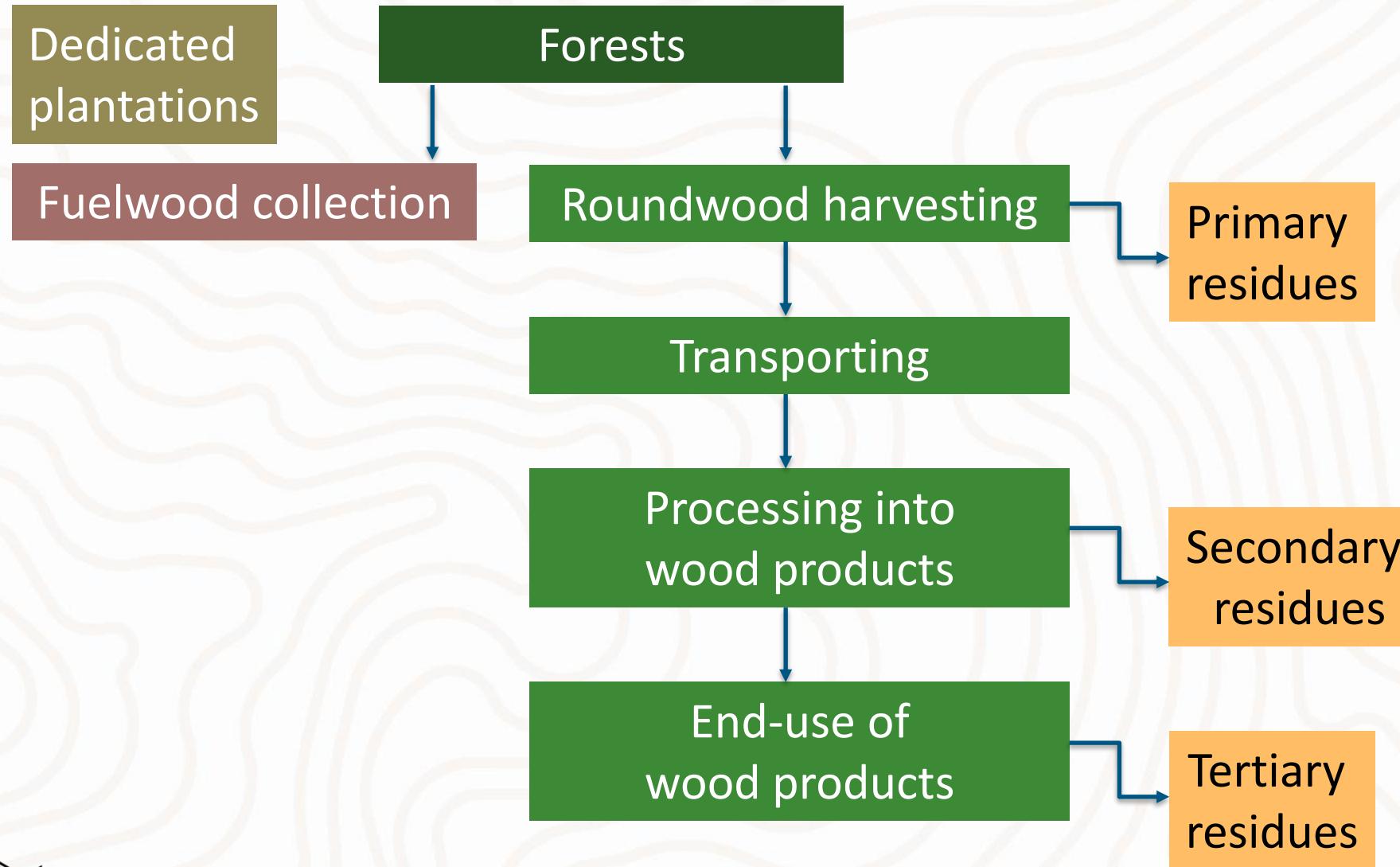
Stages of commercial development of biomass conversion pathways

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		
			IG-Combined Cycle	G and Steam Cycle	
		Anaerobic Digestion to Biogas	2-Stage	Landfills (1-Stage)	
Wet Waste	Heat or Power or Fuel	Microbial Fuel Cell	Reforming to Hydrogen (H ₂)	Small Manure Digesters	
			Biogas Upgrading to Methane		
			Hydrothermal Processing to Oils or Gaseous Fuels		
Sugar or Starch Crops	Fuels	Sugar Fermentation	Butanol	Ethanol	
		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	
Oils Vegetable or Waste					

Conversion pathways for woody biomass are technologically and commercially mature

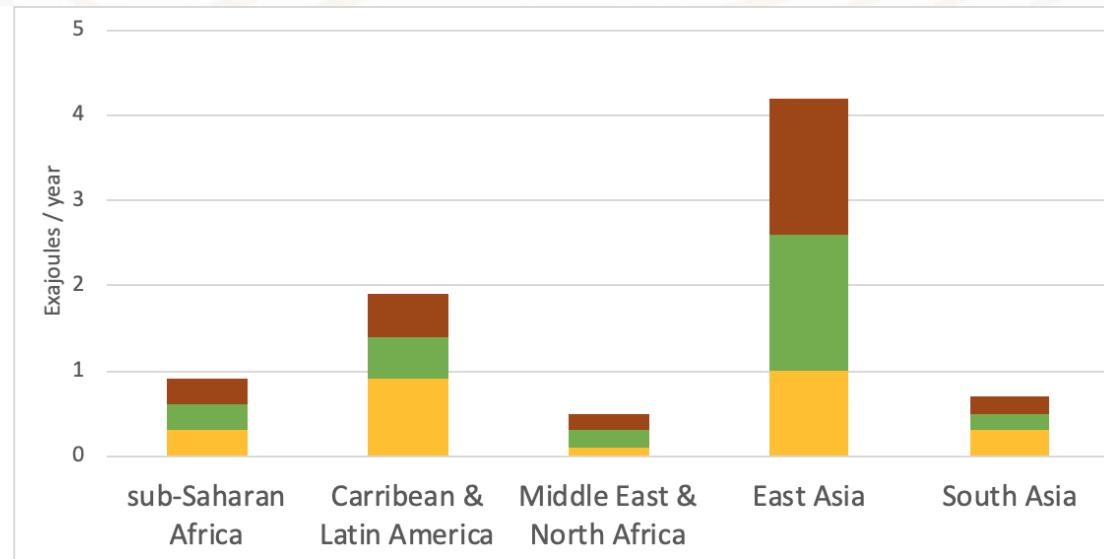
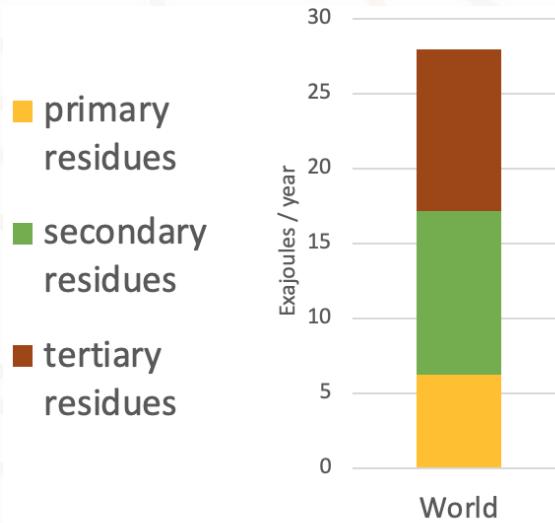


Categories of woody biomass

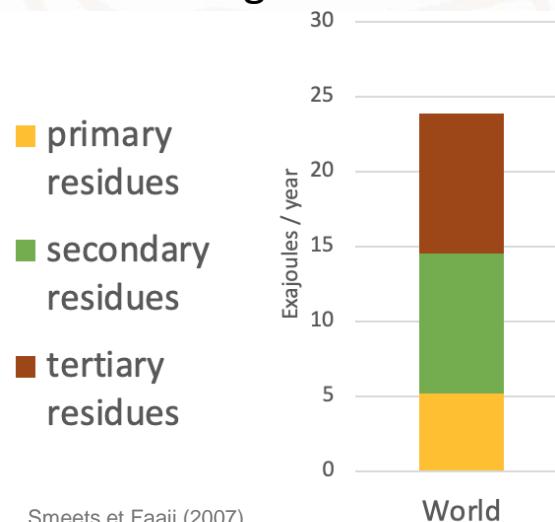


Potential of wood residues for modern bioenergy

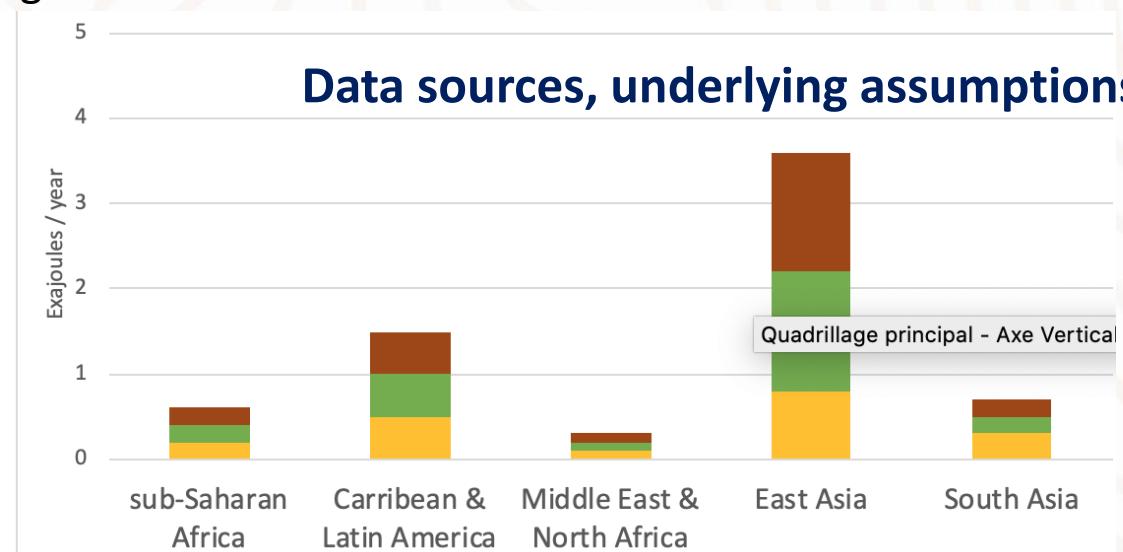
Theoretical potential



Potential taking into account ecological and economical constraints



Data sources, underlying assumptions?



The use of secondary residues: Example from Ghana

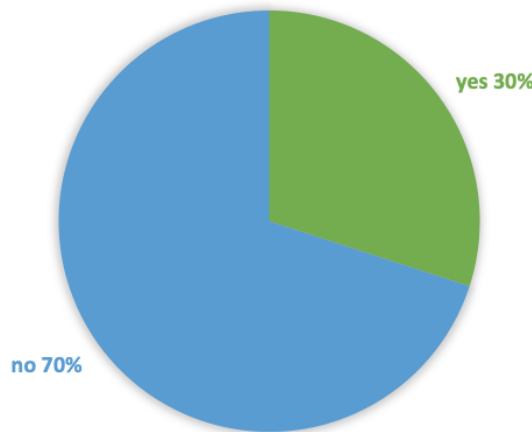


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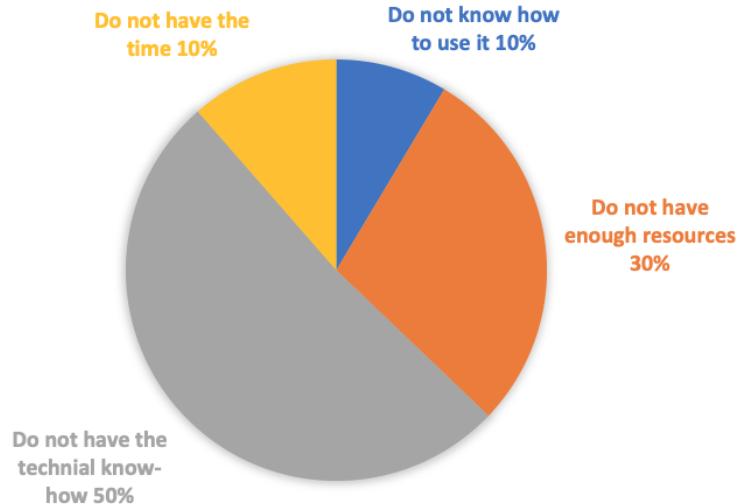
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Survey of 50 wood processing facilities

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



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



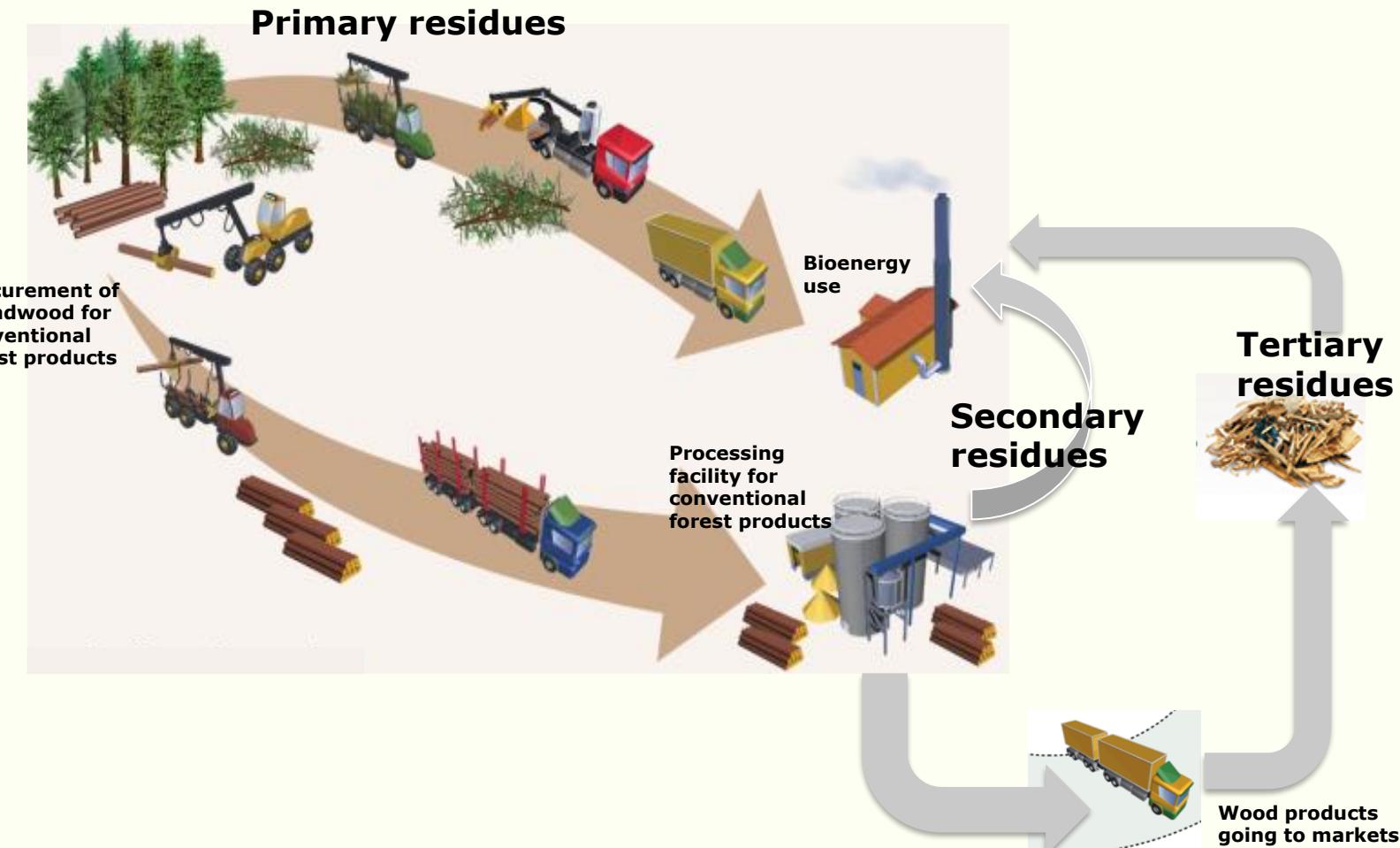
How can we ensure technological learning in
the context of developing countries?

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

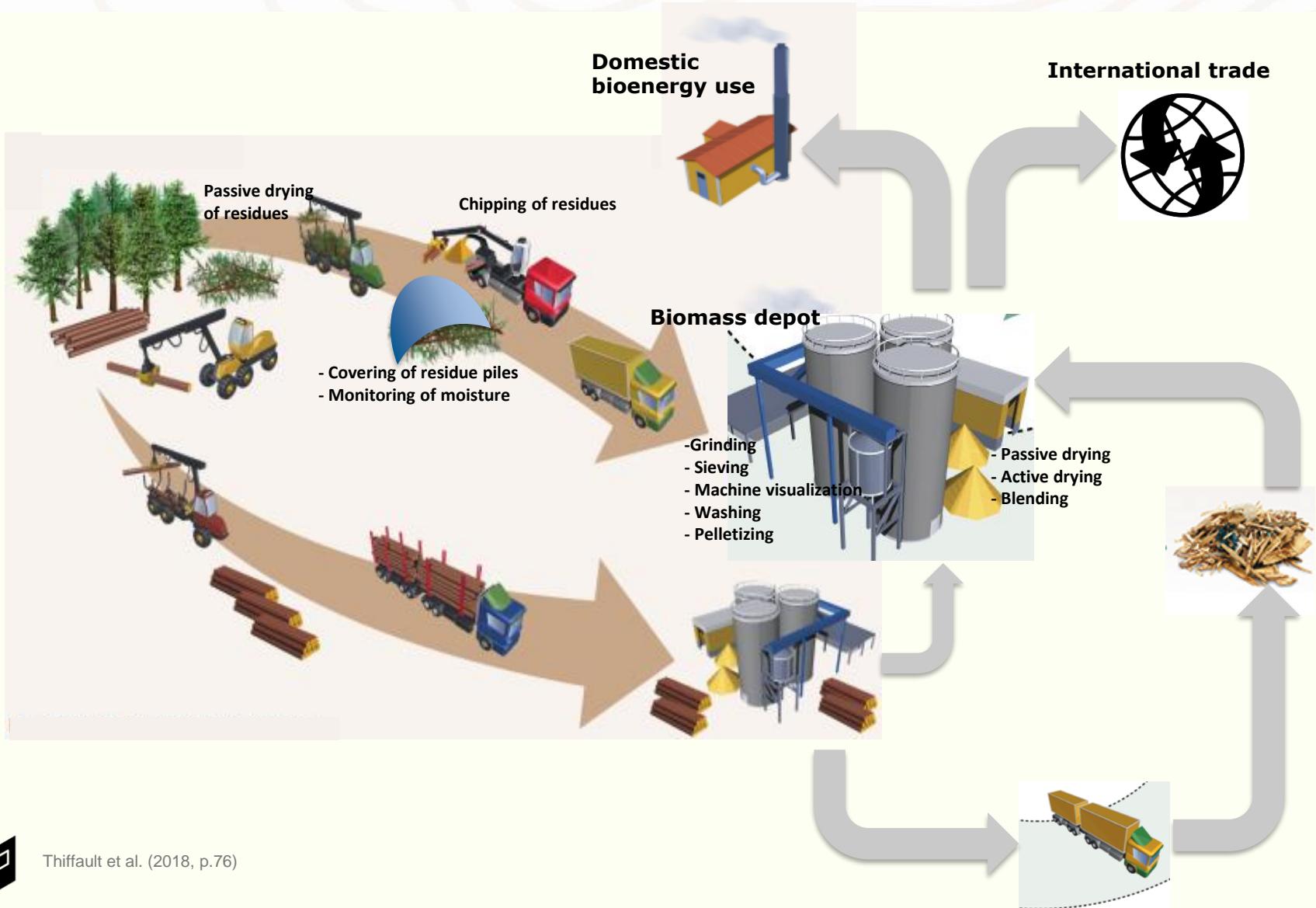


Asamoah et al. (2020)

Wood residue supply chain, basic version



Wood residue supply chain, optimized version



Example from Canada



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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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Bioénergie
LA TUQUE

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?



SUSTAINABLE DEVELOPMENT GOALS

17 GOALS TO TRANSFORM OUR WORLD



1 NO
POVERTY



2 ZERO
HUNGER



3 GOOD HEALTH
AND WELL-BEING



4 QUALITY
EDUCATION



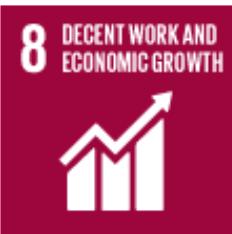
5 GENDER
EQUALITY



6 CLEAN WATER
AND SANITATION



7 AFFORDABLE AND
CLEAN ENERGY



8 DECENT WORK AND
ECONOMIC GROWTH



9 INDUSTRY, INNOVATION
AND INFRASTRUCTURE



10 REDUCED
INEQUALITIES



11 SUSTAINABLE CITIES
AND COMMUNITIES



12 RESPONSIBLE
CONSUMPTION
AND PRODUCTION



13 CLIMATE
ACTION



14 LIFE
BELOW WATER



15 LIFE
ON LAND



16 PEACE, JUSTICE
AND STRONG
INSTITUTIONS



17 PARTNERSHIPS
FOR THE GOALS



SUSTAINABLE
DEVELOPMENT
GOALS

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