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Assessing sustainable biomass export potentials: methodological considerations

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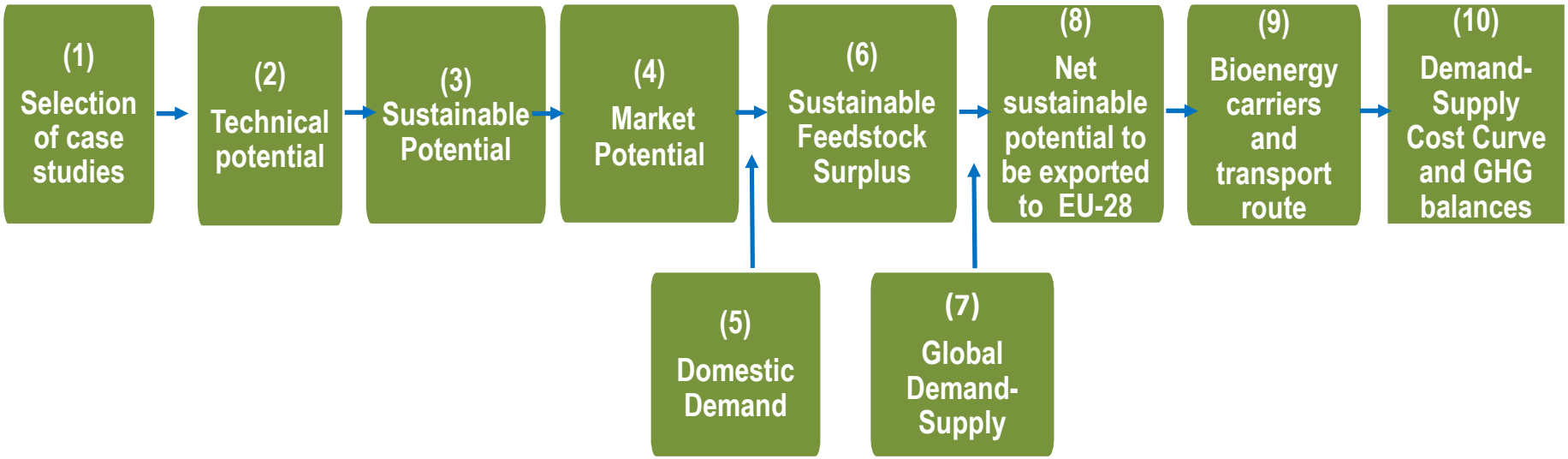
Assessing Sustainable Bioenergy Import Chains



Main equations:

(3) = (2) – unsustainable biomass

(4) = (3) * market potential (semiquantitative analysis)

(6) = (4) – (5)

Note: From Step 3 onwards, potentials are subject to scenario conditions (BAU…)

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Scenario approach

Scenarios	Current (2010/ 2012 and 2014/2015)	BAU		Optimistic	
Timeline		2020	2030	2020	2030

Aim	Anticipate possible changes in local & global biomass markets & trade at different time scales
Method	Based on : - Socio-economic development - Policies on environment, climate, energy and industrial promotion - Innovative pre-treatment technologies
Data	- International & national databases (FAOSTAT, national statistics) - Communication with local & international stakeholders
Expected outcomes	Data for “Current” plus BAU and Optimistic Scenarios for 2020 and 2030

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(1) Selection of case studies → (2) Technical potential

(1) Selection of case studies (I)

Aim	Determine the most promising exporting countries to the EU-28 , and respective lignocellulosic feedstocks to be exported from each country
Method	in consultation with experts and based on : - National production in agriculture and forestry sectors - Biomass trade patterns - Political situation - Data availability
Data	- International & national databases (e.g. FAOSTAT, national statistics) - Communication with local experts - Other projects and reports
Expected outcomes	- Database for the selected indicators - Final selection of the case studies

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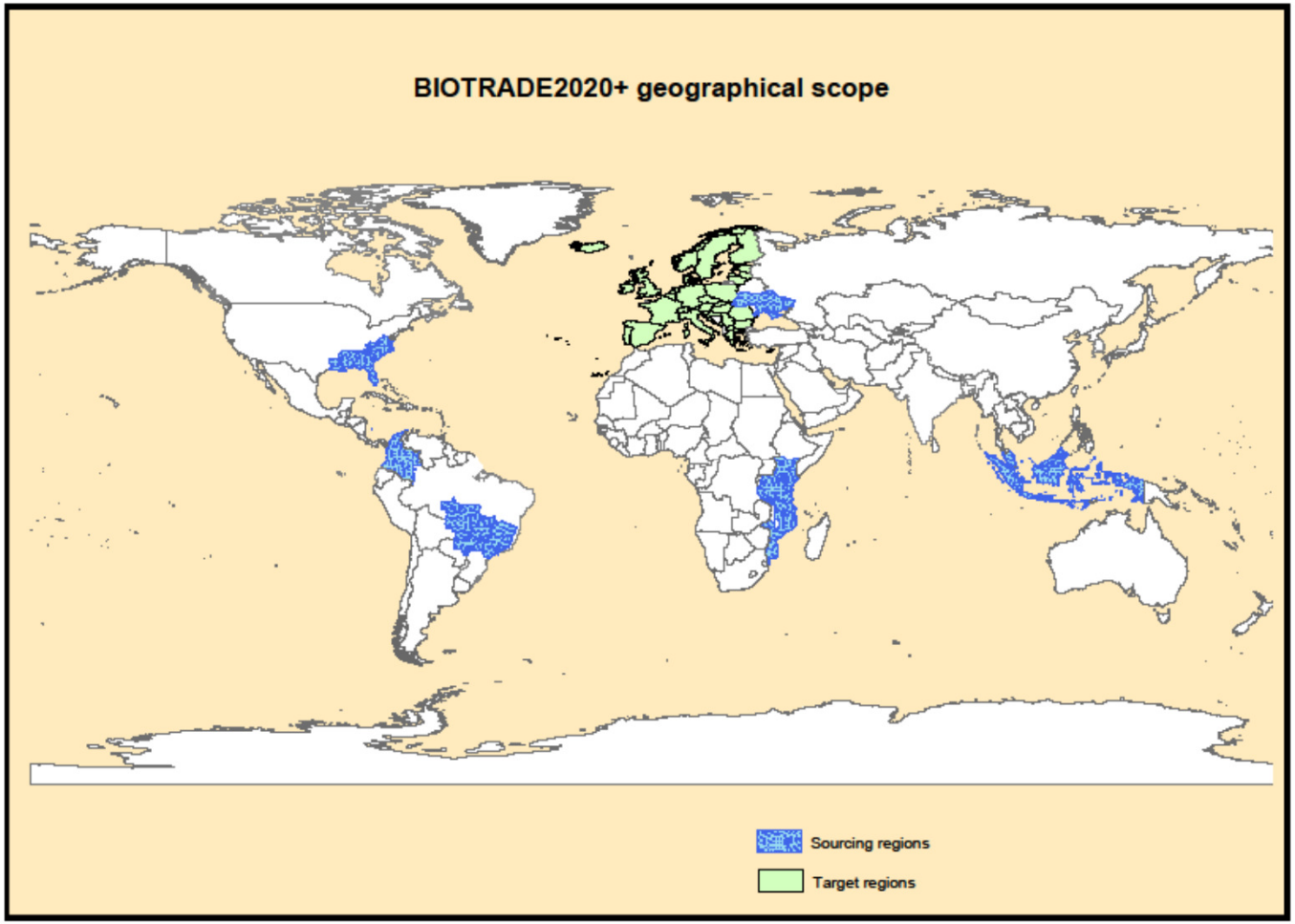
(1) Selection of case studies → (2) Technical potential

(1) Selection of case studies (II)



Feedstock scope:

Forest residues

Agricultural residues

Energy crops (lignocellulosic + woody)

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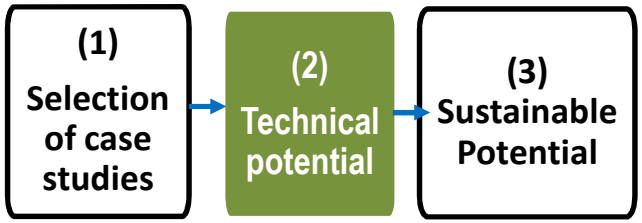

(2) Technical potential

Aim	Determine the total technical potential of given feedstocks in case study countries, taking into account current production of lignocellulosic biomass and land availability
Method	Assessment made on information related to: - Selection of the relevant provinces/states (if relevant) - Specific spreadsheet for data collection (incl. results of other studies) - Application of GIS Technical potential = technically harvestable biomass
Data	- National or international statistics - GIS databases - Other studies about potentials (past reports…) - Contact with local experts, if needed
Expected outcomes	Aggregated technical potential (PJ or Mt) by country and feedstock for the baseline year (2010 or 2012) plus 2020 and 2030

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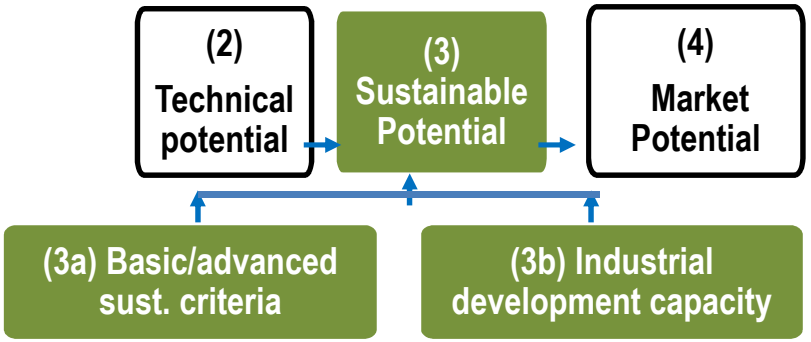
(3) Sustainable potential



	3a. Sustainable potentials for basic/advanced criteria	3b. Industrial development capacity
Aim	Determine sustainable potential for basic (EU RED) and advanced economic, environmental, social and institutional criteria	Determine sustainable potential considering the industrial development capacity
Method	Same as for Step 2 + reducing thechnical potentials through application of sustainability indicators (GIS and LCA)	Project sustainable industrial capacity in 2020 + 2030, taking into account past developments and new technologies for BAU and optimistic scenarios
Data	Same as for Step 2, plus literature review	Past developments of industrial capacity for feedstocks + projected developments, incl. demand for other uses
Expected outcomes	Aggregated sustainable potential (PJ) by country and feedstock 2020 + 2030, considering basic/advanced sustainability	Establish potential sustainable industrial capacity for each type of feedstock for 2020 and 2030 (PJ)

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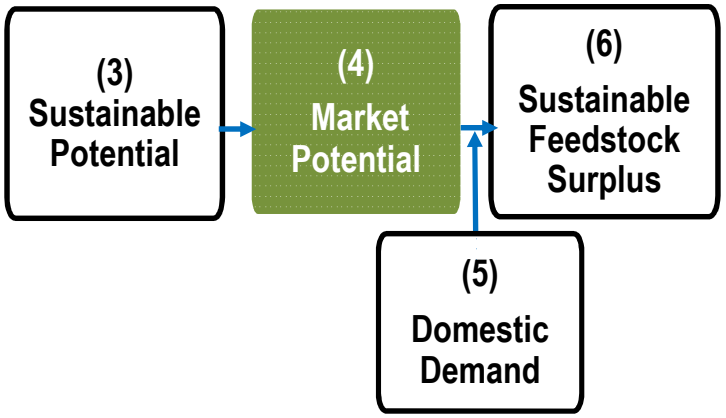

(4) Market potential

Aim	Determine the total market potential of a given feedstock in any country. Market potential is meant as the (market) conditions under which sustainable potentials could be mobilized.
Method	Qualitative argumentation on current market situation and future demands
Data	- Current use of feedstocks and characterization - Expected domestic demand - Policies (and its stability) in third countries (e.g. EU-28 or EU MS)
Expected outcomes	Aggregated market potential (PJ) by country and feedstock for base year (2010 or 2012) + 2020 and 2030

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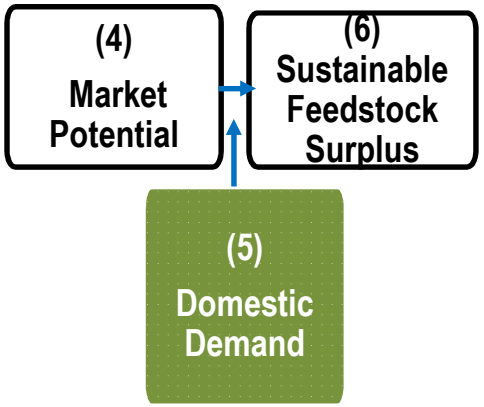

(5) Domestic demand

Aim	Understand demand of lignocellulosic feedstocks for energy & various uses at sourcing countries: - Traditional non-energy uses - Traditional energy uses - New biomass applications
Method	in consultation with expert opinion and based on: - Socio-economic development (living standards, GDP…) - Policies in energy, environment & climate
Data	- International & national databases (e.g. FAOSTAT, national statistics) - Communication with local experts - Results from other projects/studies
Expected outcomes	Domestic demand for all uses (energy and non-energy uses, new biomass applications) for 2020 and 2030

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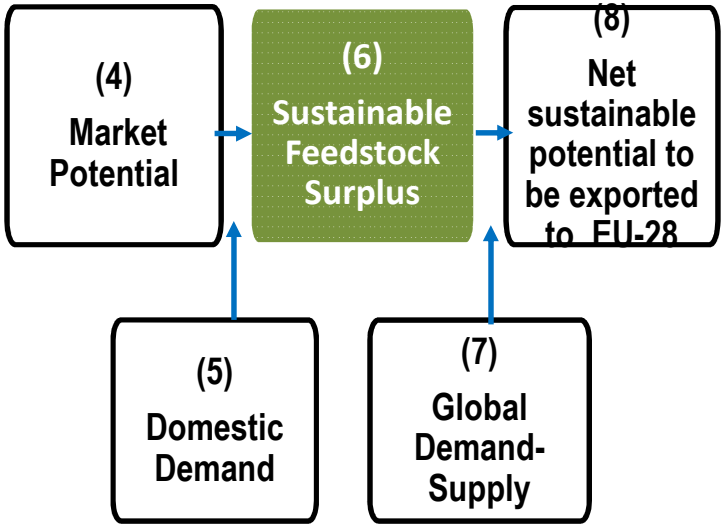

(6) Sustainable feedstock surplus

Aim	Identify surplus of sustainable feedstock potential
Method	(6)= (4)-(5)
Data	Same as for (4) and (5)
Expected outcomes	Inventory of feedstock surplus in scenarios

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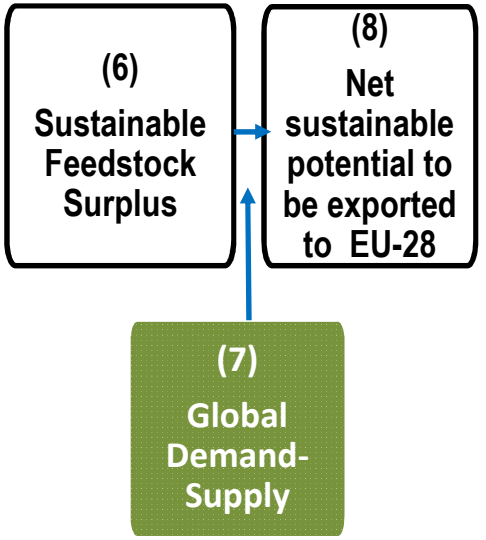

(7) Global demand & supply

Aim	Understand biomass demand and supply flow at global level
Method	Consult external sources & data: - IEA World Energy Outlook - IEA Energy Technology Perspectives (2014) - Global demand by model estimation
Data	- IEA World Energy Outlook + ETP studies - Eurostat, FAOSTAT - Related reports
Expected outcomes	- Overview of global demand & supply of biomass for different time frames - Outline of EU position in global biomass trade map

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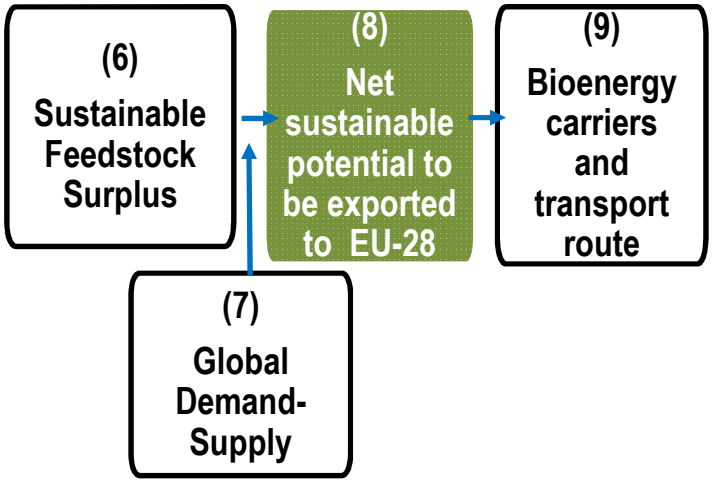
(8) Net sustainable potential for exports to EU28



Aim	Estimate final potential of feedstock to be exported to EU-28 that meet sustainability criteria
Method	- Estimation of domestic supply capacity - Consideration of global demand (other importing countries) - GLOBIOM model
Data	Global demand and trade projections (from IEA)
Expected outcomes	Net sustainable export potentials

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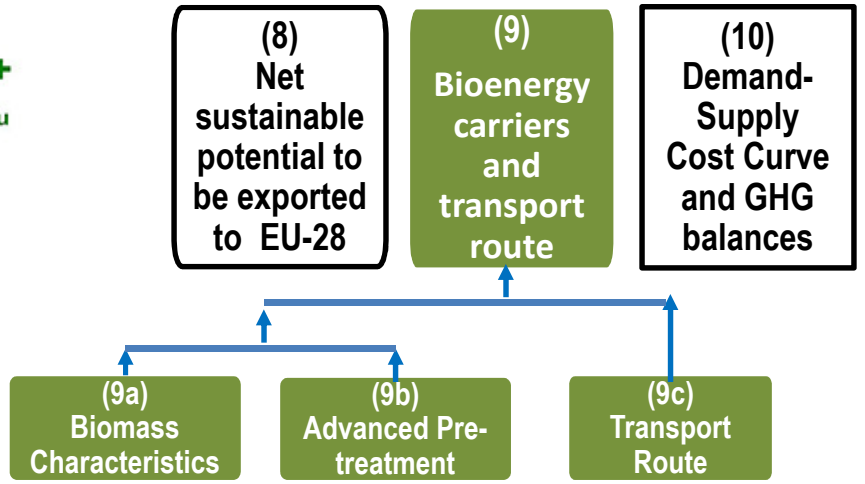
(9) Biomass carriers + transport route



	9a) Biomass Characteristics	(9b) Technologies for pre-treatment	(9c) Transport route
Aim	Define and select suitable biomass for export	Identify technologies to treat specific feedstocks	Design optimal transport routes
Method	Identify key factors for easy biomass transport and cost reduction	Based on literature research, identify current and anticipate treatments.	BIT-UU model
Data	Production cost, feedstock composition	Physical & chemical characteristics of biomass feedstocks	Geographical data of sourcing regions, mainly from national statistics and site survey
Expected outcomes	Selection of sustainable biomass pre-treatment based on characteristics	Biomass pre-treatment in the scenarios	Cost of biomass supply & over time

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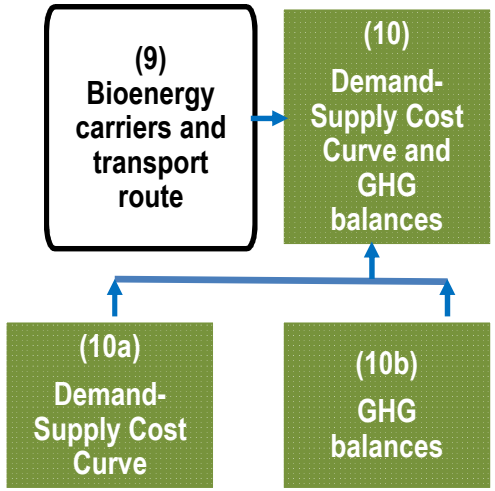
(10) Supply & demand cost curve + GHG balances of bioenergy imports



	(10a) Demand-Supply Cost Curve	(10b) Determine GHG emissions
Aim	Estimate total cost of biomass in the supply chains Combine with supply over time to create cost-supply curves	Determine GHG emissions in whole supply chain
Method	Use cost balance equation	Use GHG emissions equation in RED Annex V + C stock change/iLUC
Data	- Cost in the different stages of biomass supply chains - Cost drivers in different scenarios	- Emissions in different processes - Literature reviews and external sources
Expected outcomes	Cost of biomass supply over time	Options to reduce GHG emissions & amount of importable solid bioenergy

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Thank you – questions?

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