Case study:
Woody biomass from South-East U.S.
Approach and preliminary results

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Towards sustainable international biomass trade strategies
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Disclaimer

This presentation aims to show how the methodology to assess sustainable potentials and respective demand-supply cost curves in the BioTrade2020+ project will be applied to the case-studies – here, the one for the US South East. Work on this case study is ongoing so that all data are preliminary and **shown only for illustration** purposes.

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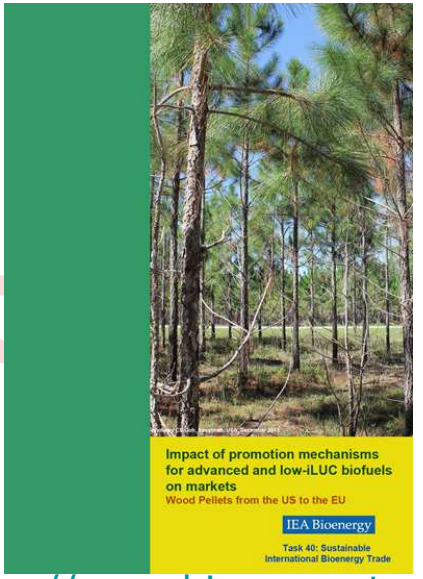
1)

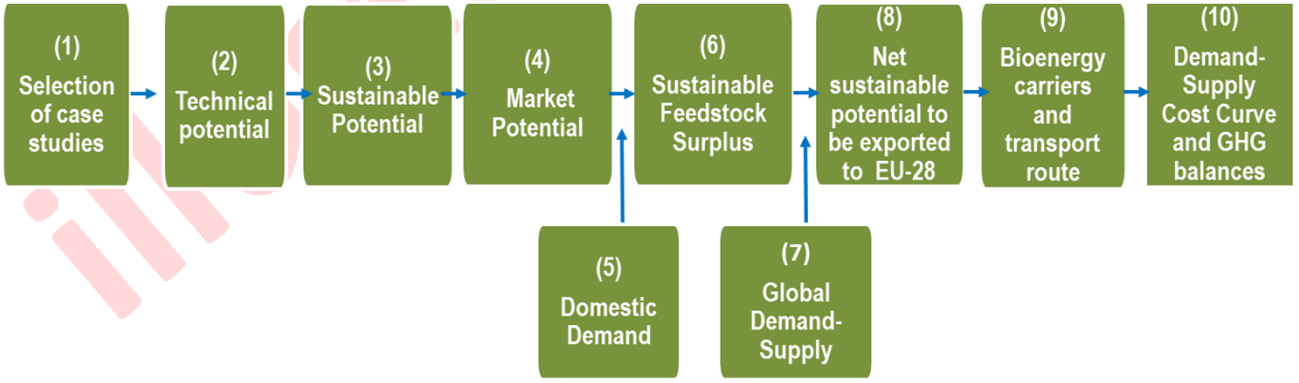
http://www.biomasspolicies.eu/

2)



http://www.bioenergytrade.org/downloads/t40-low-iluc-pellet-august-2014.pdf

3) Biotrade common methodology



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Scenario approach

- Further work needed to define the BAU and optimistic scenarios
- High increase in supply availability; High domestic demand

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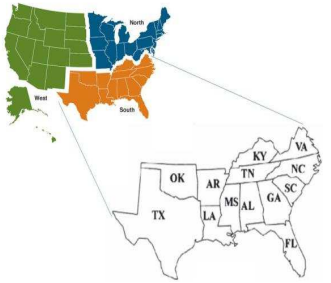
(1) Selection of case studies

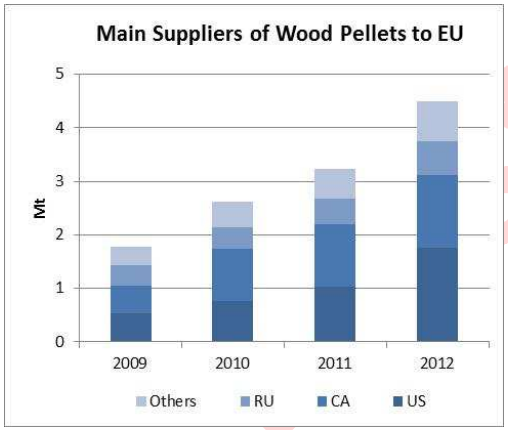
(1) Selection of case studies → (2) Technical potential

U.S.: High Domestic demand of Advanced Biofuels in the medium term →
Neither agricultural residues nor energy crops for exports → Woody pellets

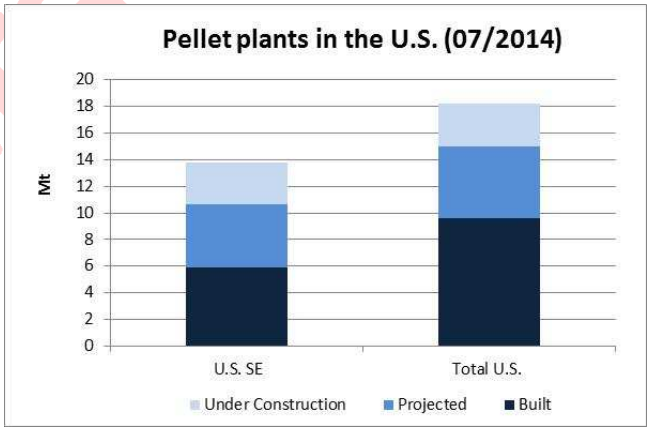
Currently relevant exports of woody pellets from the U.S. South East (SE) to EU and expected to continue because:

- High potential of forest Biomass in the U.S. SE
- Current market situation and investment stability
- Proximity to EU





Source: USDA FAS (2013)



Source: Own calculations based on Biomass Magazine (2014)

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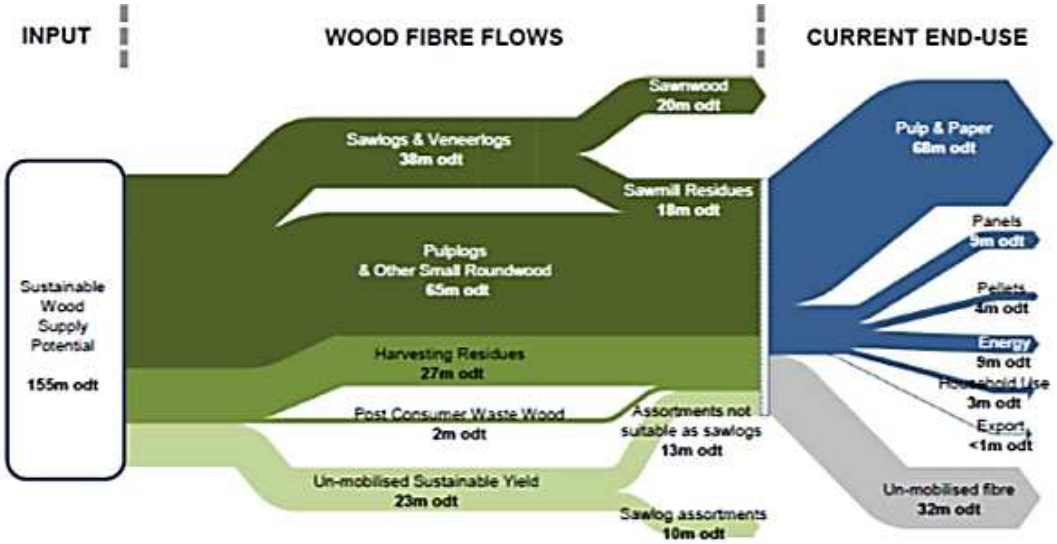
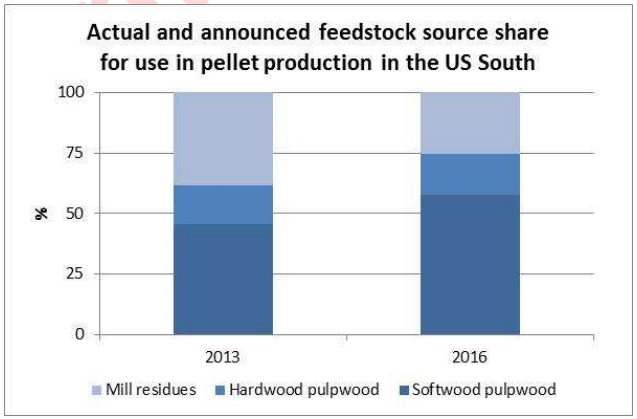
(2) Technical Potential

(1) Selection of case studies → (2) Technical potential → (3) Sustainable Potential

Wood flow in the U.S. SE, 2013



Source: Pöyry (2014)



Source: Forisk Inc (2014) in Abt et al. (2014)

Technical potential in 2030

- Intensification in pine plantations
- Increase in plantations
- Other sources: demolition wood, trees outside the forest

Technical supply by 2030: 208-225 M_{odt}
(in a "positive" scenario of the Southern Forest Futures Project. Source: Own calculations based on Wear et al. (2013) and Alavalapati et al. (2013)

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(3) Sustainable Potential

(2) Technical potential → (3) Sustainable Potential → (4) Market Potential

Climate Change:

- GHG gas performance of woody biomass for el. & heating: high savings

Woody biomass source for energy use	Time horizon for CO_2 emission reduction					
	Short (10 years)		Medium (50 years)		Long (centuries)	
	Coal	gas	coal	gas	coal	gas
Boreal, stems final harvest	---	---	-	--	+	+
Temperate, stems final harvest	---	---	+/-	-	++	+
Harvest residues + thinnings, landscape care & salvage wood*	+/-	+/-	+	+	++	++
SRC on marginal agricultural land	+++	+++	+++	+++	+++	+++
SRC replacing forest	-	-	++	+	+++	+++
industrial residues, wastes	+++	+++	+++	+++	+++	+++

*-; --; ---: **bioenergy system emits more** CO_2eq than reference fossil system **in given time frame***
*+/-: GHG emissions of bioenergy and fossil are comparable **in given time frame***
*+; ++; +++: **bioenergy system emits less** CO_2eq than reference fossil system **in given time frame***
**For residues, thinnings & salvage wood: depending on alternative use (burning) and decay ratess*
Source: own compilation based on JRC (2013)

- But: impact on forest C stocks (?)

Biodiversity:

- Change of natural forest stands into plantations
- Wetlands
- Harvesting in sourcing areas

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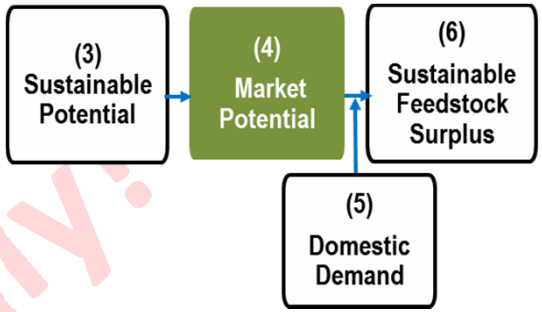
(4) Market potential



Reliable investment capacity →
No constraints due to markets conditions

→ Sustainable potentials = Market potentials

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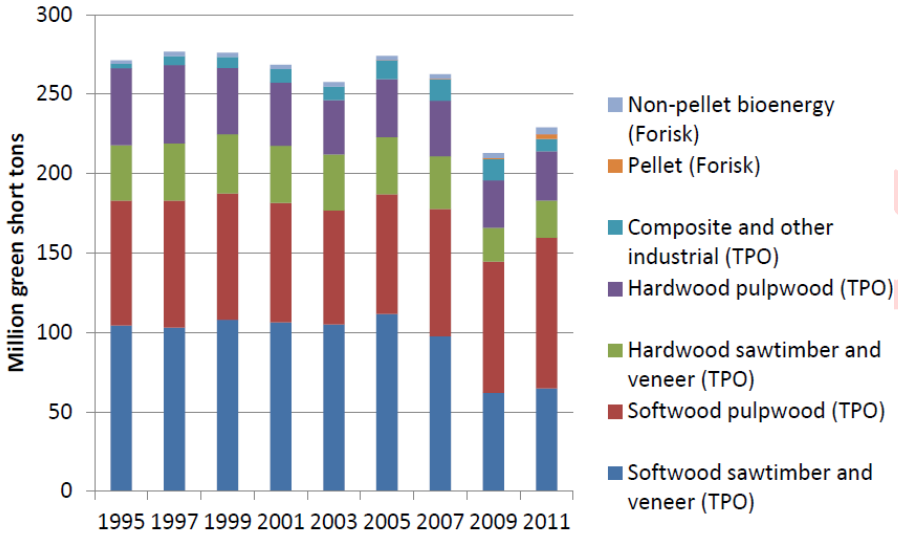
(4) Market Potential → (6) Sustainable Feedstock Surplus

(5) Domestic Demand

(5) Domestic Demand by 2030

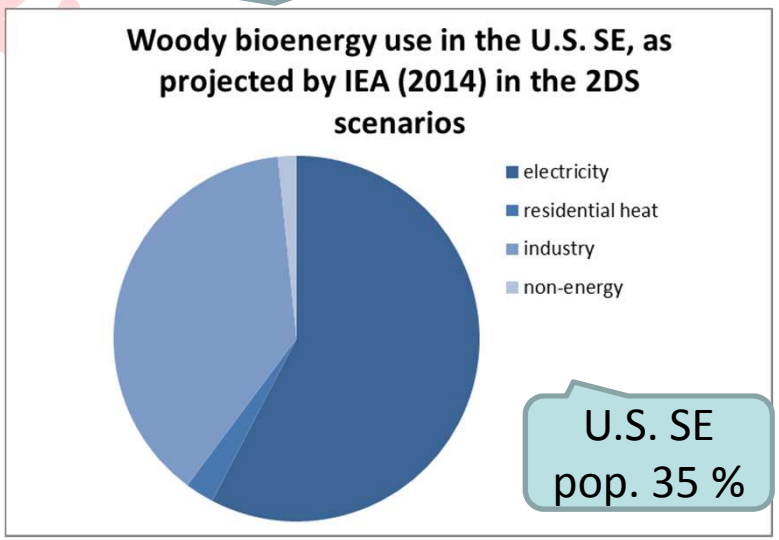
2007 levels ~ 111 M_{odt}
(120 M_{odt-} -9 M_{odt})

Forest product output US South (excl. TX)



Source: Abt et al. (2014)

US total woody bio ~ 6006 PJ
(~ 1732 PJ) → (~ 94 M_{odt})



Source: Own calculations based on IEA (2014)

Total domestic demand: 205 M_{odt}

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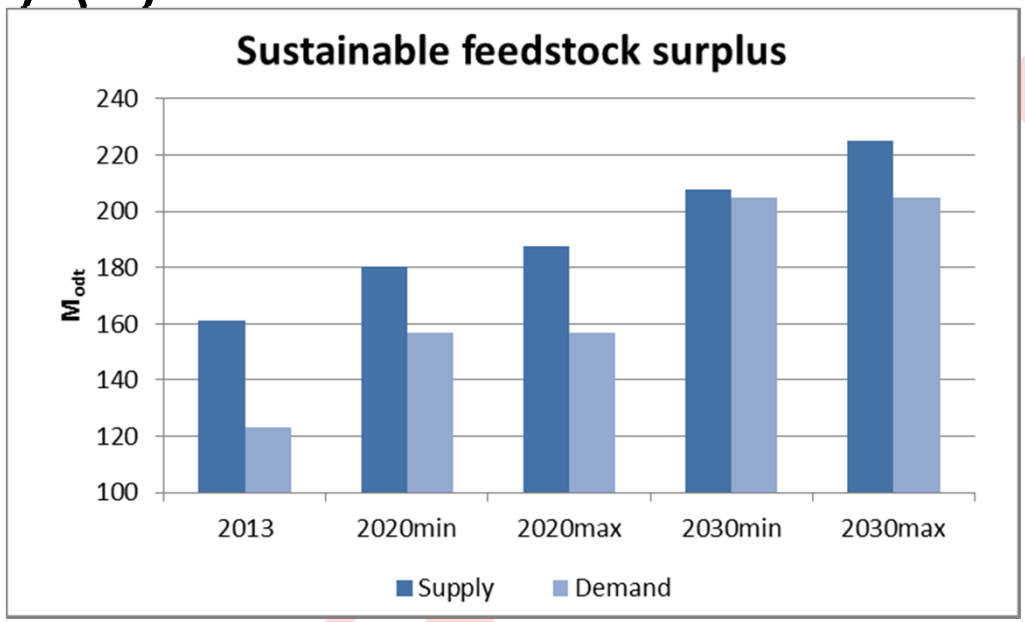
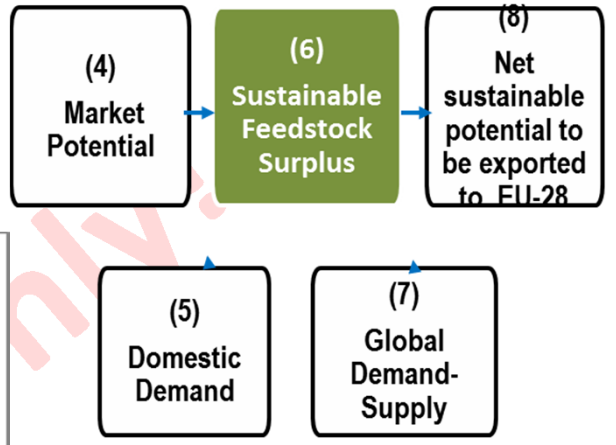
(6) Sustainable Feedstock Surplus

(6)= (4)-(5)





(4) Market potential = sustainable potential = 208-225 M_{odt}
(5) Domestic demand: 205M_{odt}
(6) Sustainable feedstock surplus :
- **2020: 24-31M_{odt}**
- **2030: 3-20 M_{odt}**

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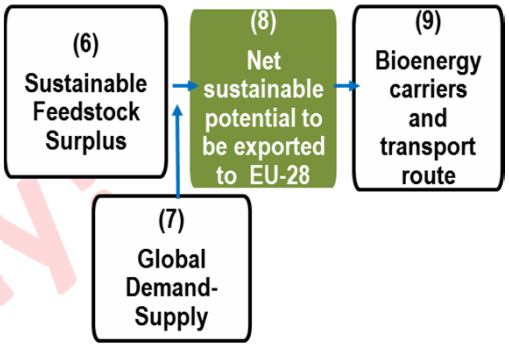
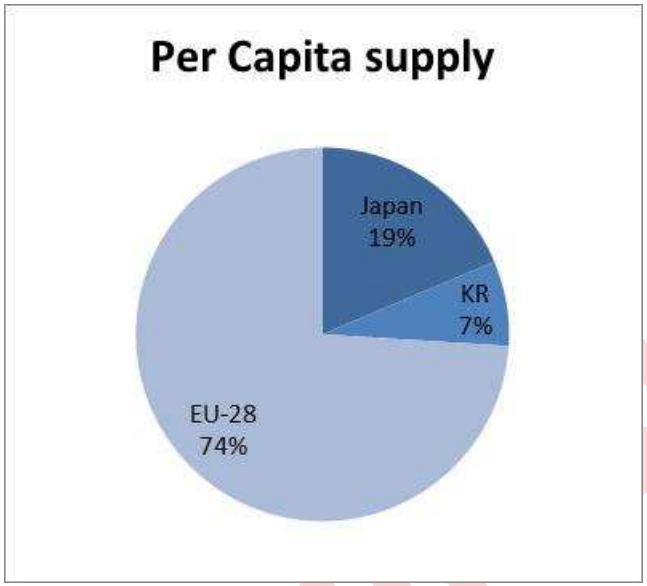
(7+8) Global demand & supply and net sustainable export potential



(8)= (6)- (7) share to the EU-28



BioTrade2020plus has selected some regions (countries) while other areas oriented to the Asian market have not been selected (e.g. CA BC) → 100 % of the U.S. to be exported to EU-28

Net sustainable potential to be exported to EU-28 = Sustainable feedstock surplus

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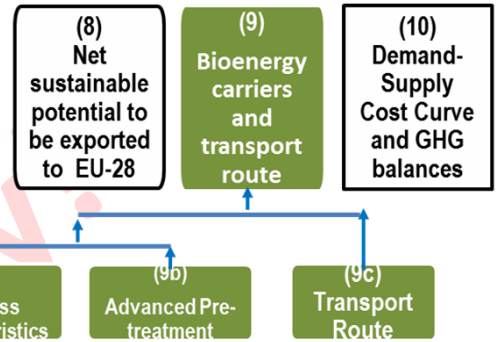
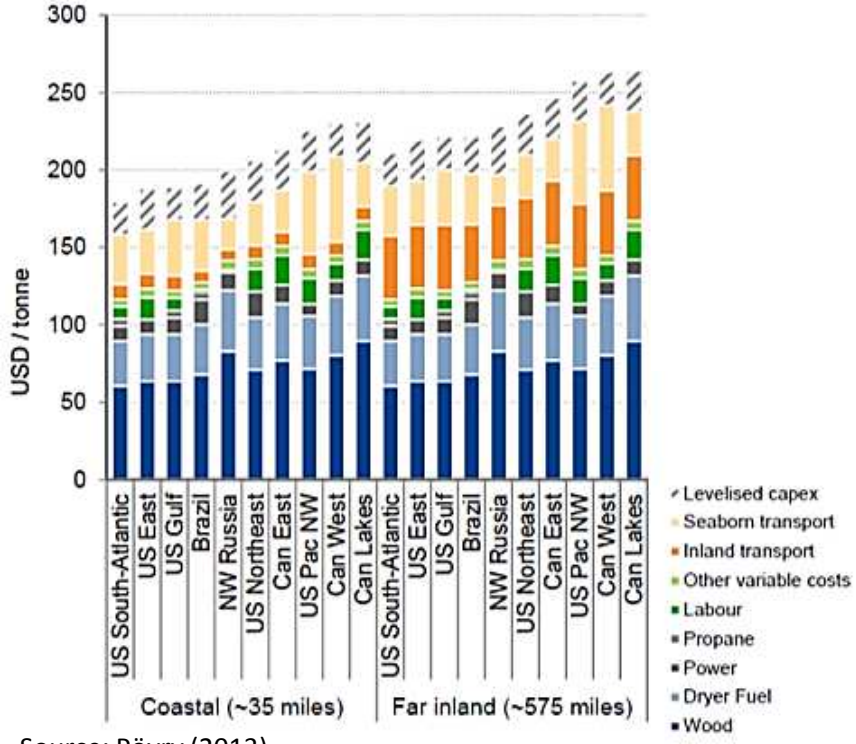
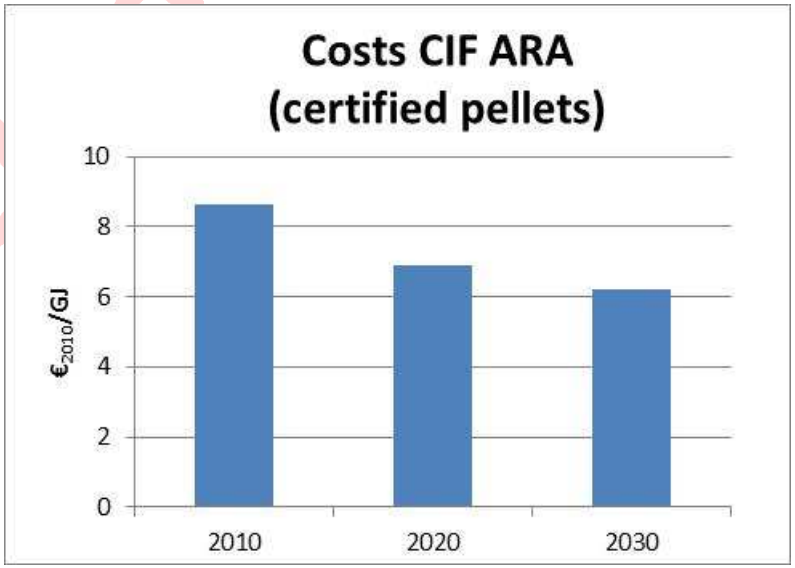
(9) Biomass carriers + transport route + costs



Pellet Supply Cost Breakdown 2011 (CIF ARA)



Source: Pöyry (2013)



Source: IINAS (2014)

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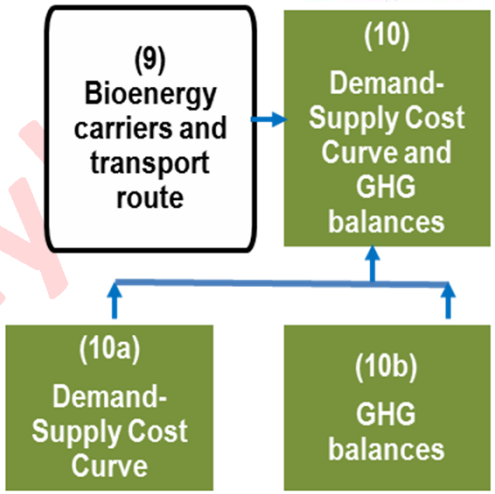
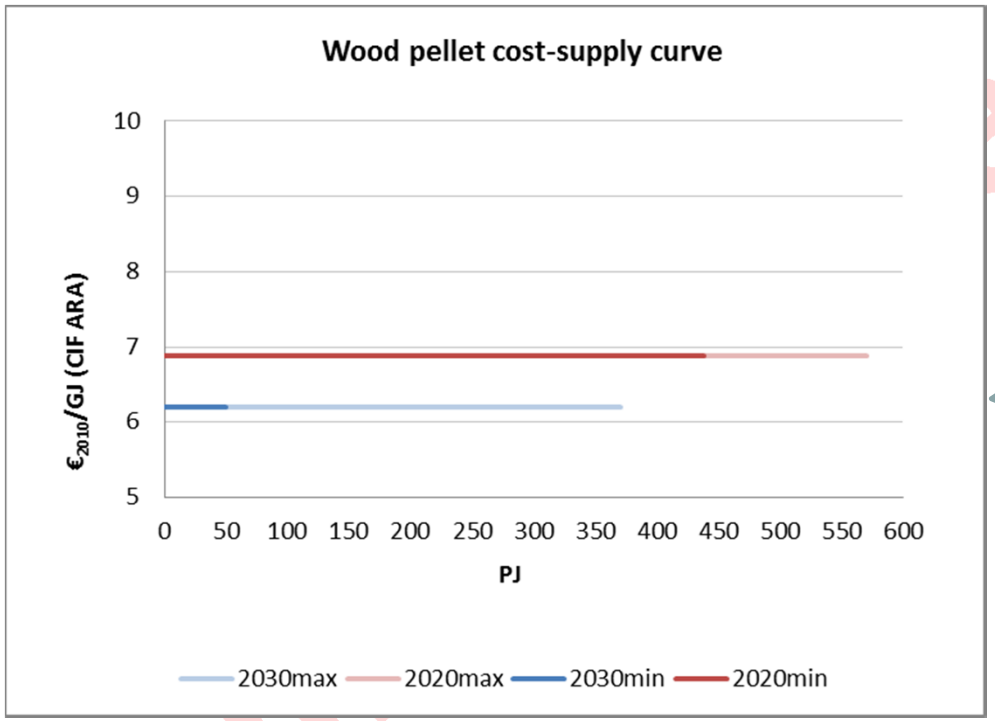
(10) Supply & demand cost of biomass





2020: 440-570 PJ @ 6.9 €$_{2010}$/GJ (CIF ARA)

2030: 50-370 PJ @ 6.2 €$_{2010}$/GJ (CIF ARA)

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Key issues

With respect to the methodologies:

- Need to define the scenarios
- Continue working on the Technical and Sustainable potentials
- Domestic demand
- Disaggregated estimation of costs

With respect to the results:

- High technical potentials at competitive costs
- Domestic demand for energy and non-energy uses

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Thank You!

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