The role biomass can play in 2020 & 2030

Deviations and consistency with NREAPs

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- RESolve models
- Scenario description
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- Results (Global) Sustainability
- Recommendations

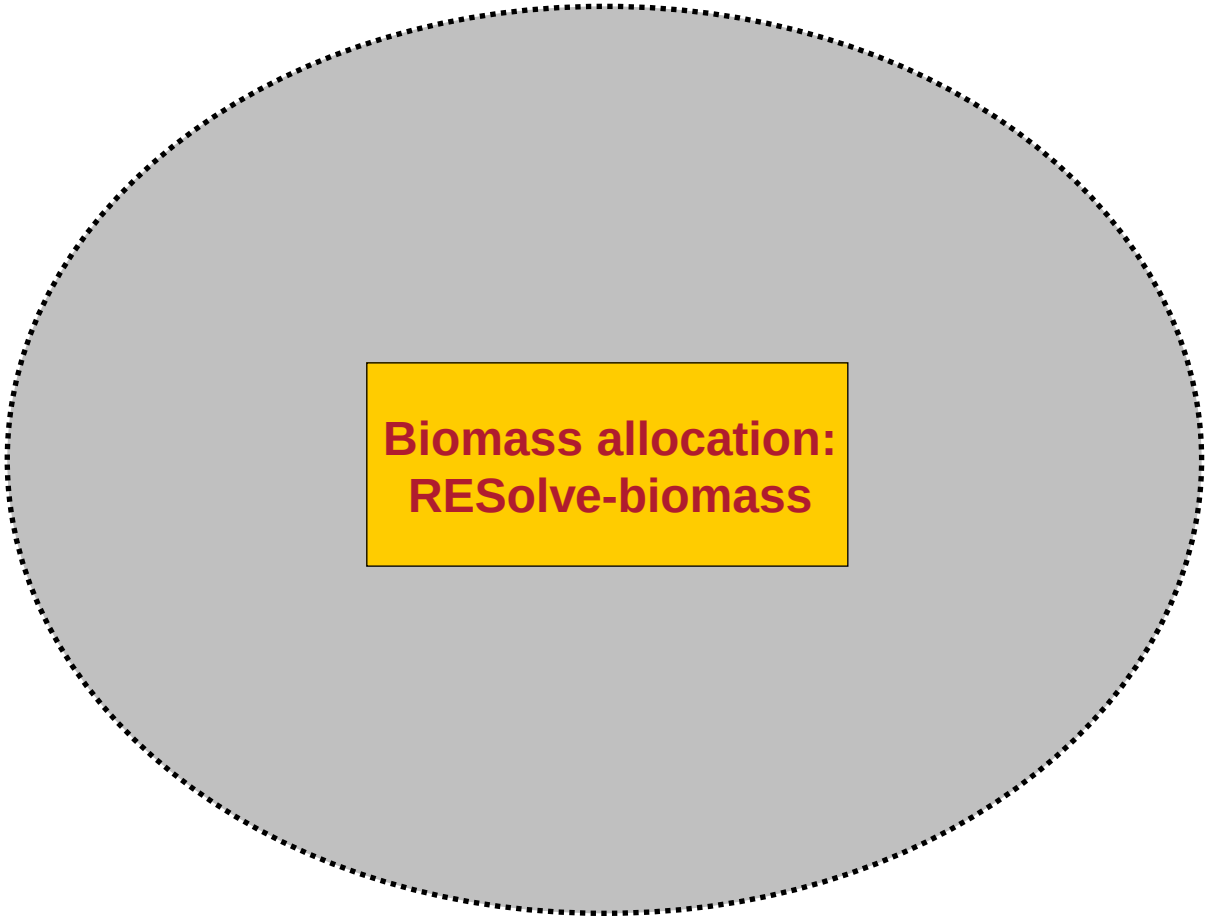
Introduction

- Model based analysis
- Focus on NREAPs
- Models used: RESolve models
- Biomass domestic cost supply: WP3 (see presentation at 16:30)
- Biomass imports: WP3 (see presentation at 16:30)
- GHG parameters: WP4
- Several scenarios have been analyzed

RESolve models

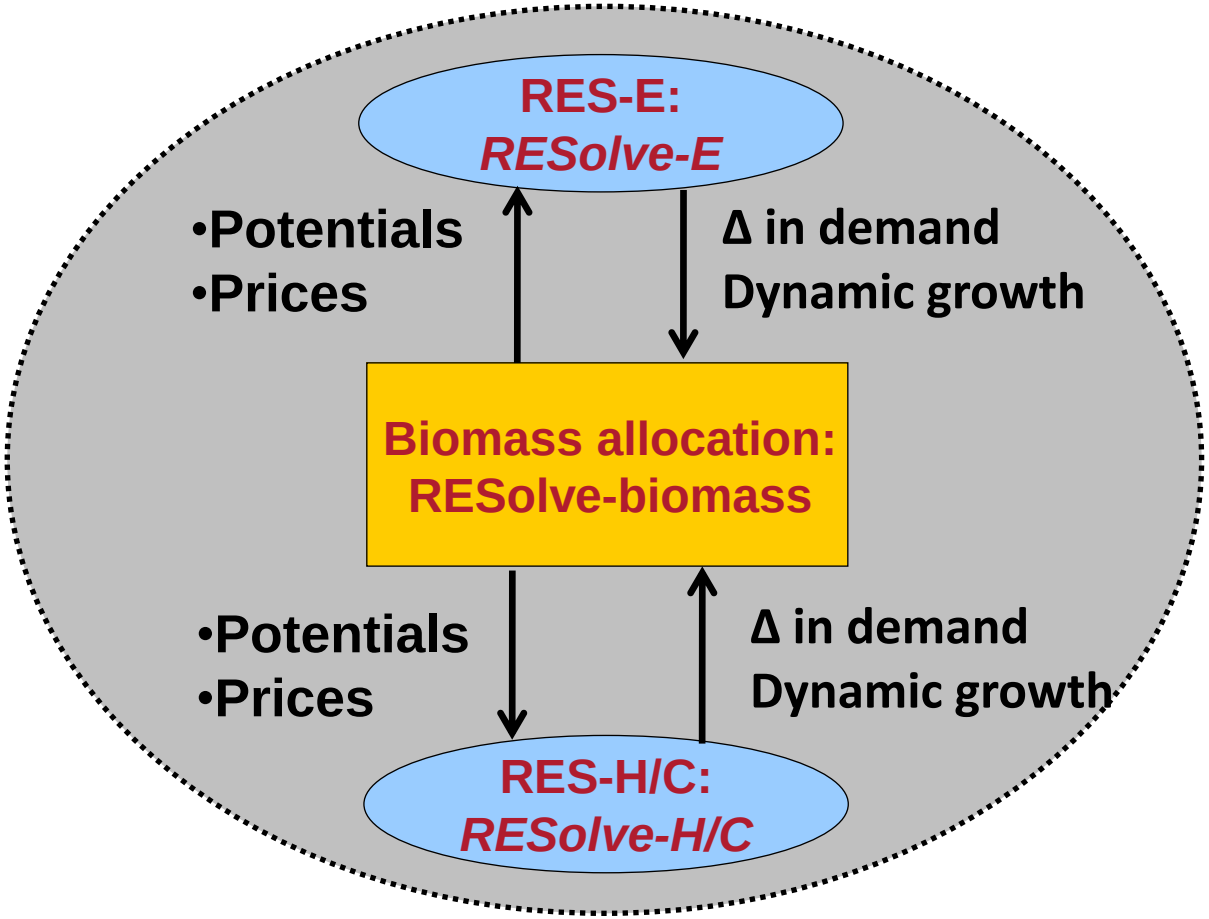
- **General:** RES only; up to 2030; on a yearly basis; EU27 (country level)
- **RESolve-E:** RES-E + heat from CHP; simulation (projection);policies important
- **RESolve-H:** RES-H; simulation (projection)
- **RESolve-biomass:** biofuels + RES-E and –H from biomass; optimization

RESolve: linkage between models



STATIC

RESolve: linkage between models



Dynamic

Biomass allocation in RESolve-biomass

*Find the **minimal additional cost allocations** along the bio-energy supply chain in the EU, given projections of demand, potentials and technological progress*

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with respect to reference commodities

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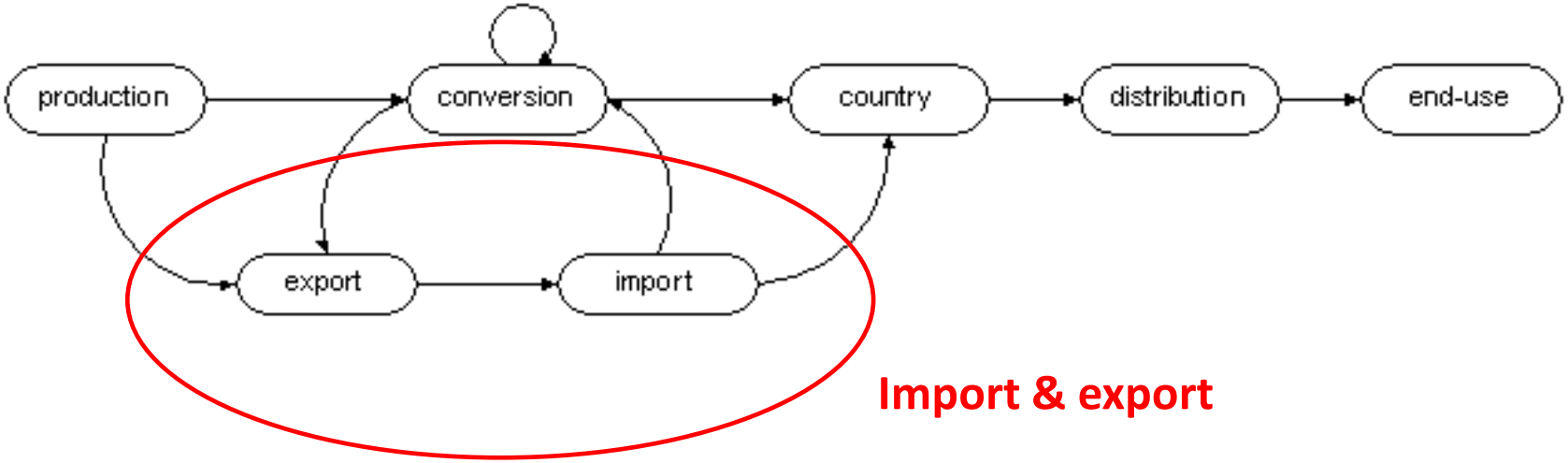
biofuel target, bio-electricity and -heat

RESolve-biomass model: how does it work?

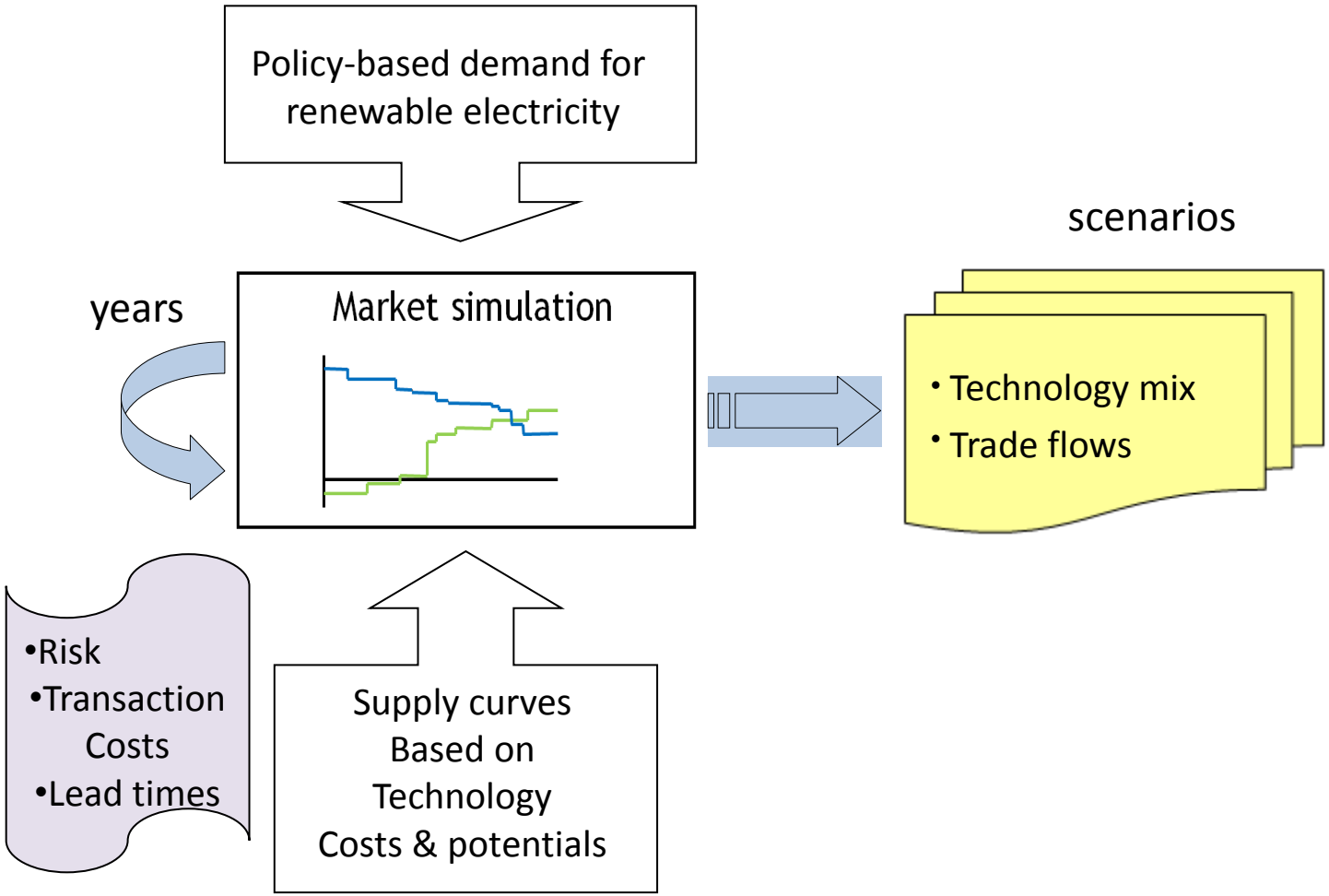


GHG constraints included

RESolve-biomass: demand segements

Biofuels	Biofuel target
RES-E	Solid biomass
	Bioliquids
	Biogas
RES-H	Solid biomass
	Bioliquids
	Biogas

RESolve-E model: how does it work?



RESolve-H model: characteristics

The model focusses on the heat demand sectors:

1. Residential sector: space heating, water heating
2. Tertiary sector: services
3. Industry: 14 subsectors, consisting of various industrial activities

Scenario assumptions

- (Bio)energy demand: NREAPs for 2020 + extrapolated using PRIMES Reference growth rates to 2030
- Policy instruments: continuation of current type of incentive schemes
- Biofuel double counting: until 2020
- Scenarios differ in the sustainability criteria applied

- **Reference :** Using RED. Only for biofuels, reaches 60% GHG mitigation in 2030
- **Sustainability:** For all domestic biomass. 70% GHG mitigation in 2020, 80% in 2030
- **Global Sustainability:** same as **Sustainability**, but iLUC is applied to biofuel imports from outside EU

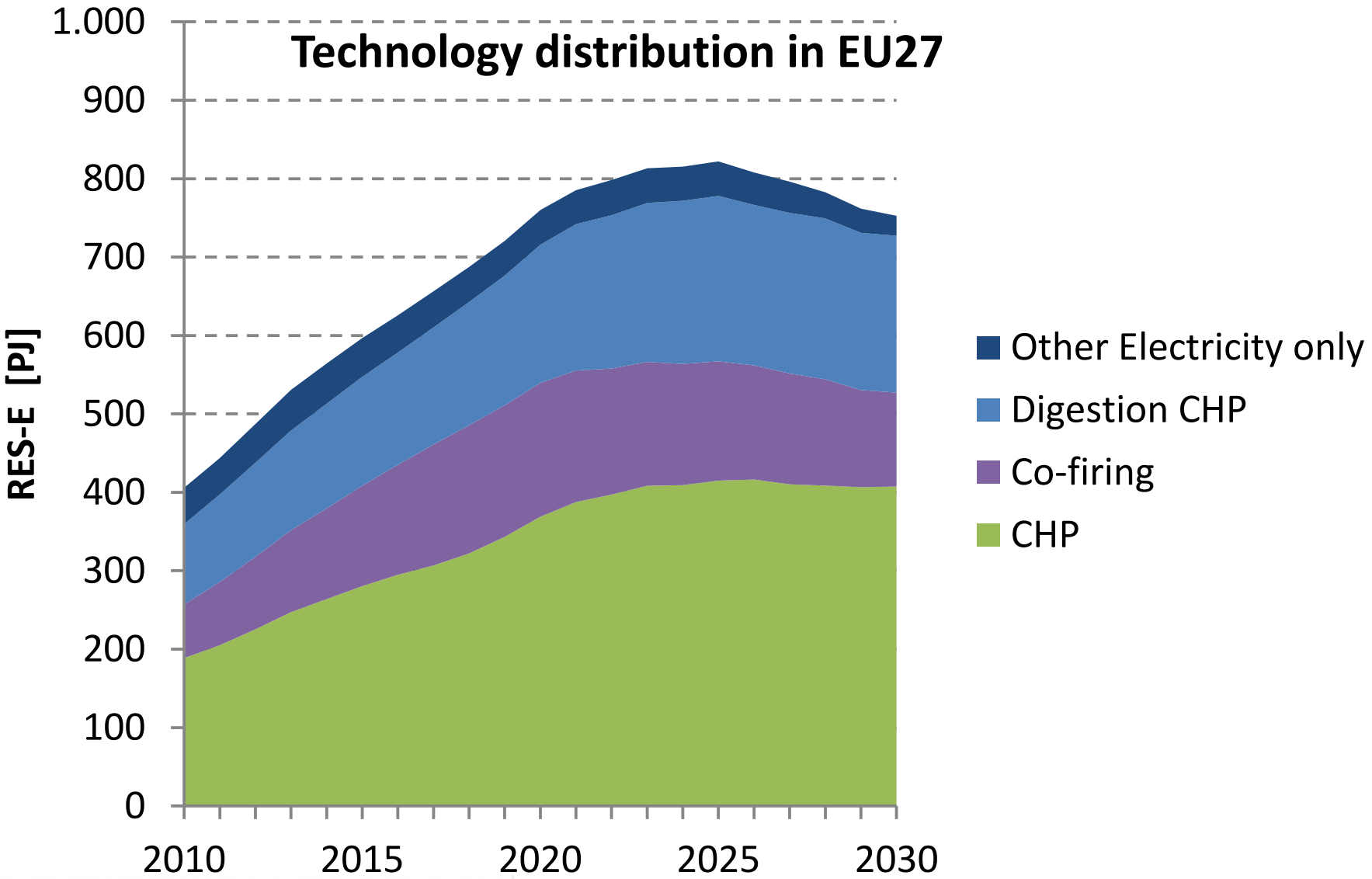
Conclusions/main results (1)

- There is enough potential, especially solid biomass, however, a part is not so attractive: round wood and part of agri. residues.
- Stricter sustainability criteria and expansion to electricity and heat has the following consequences:
  - Decrease of domestic biofuel production
  - Increased imports (biofuel and wood pellets)
  - Urgency for 2G biofuel technologies
  - Significant reduction in application of digestable and liquid biomass for RES-E and RES-H applications
- Several countries won't meet the NREAP figures for bio RES-E and RES-H. Main reasons: growth rates seem to ambitious and incentives are too low/cost-benefit ratio not attractive enough

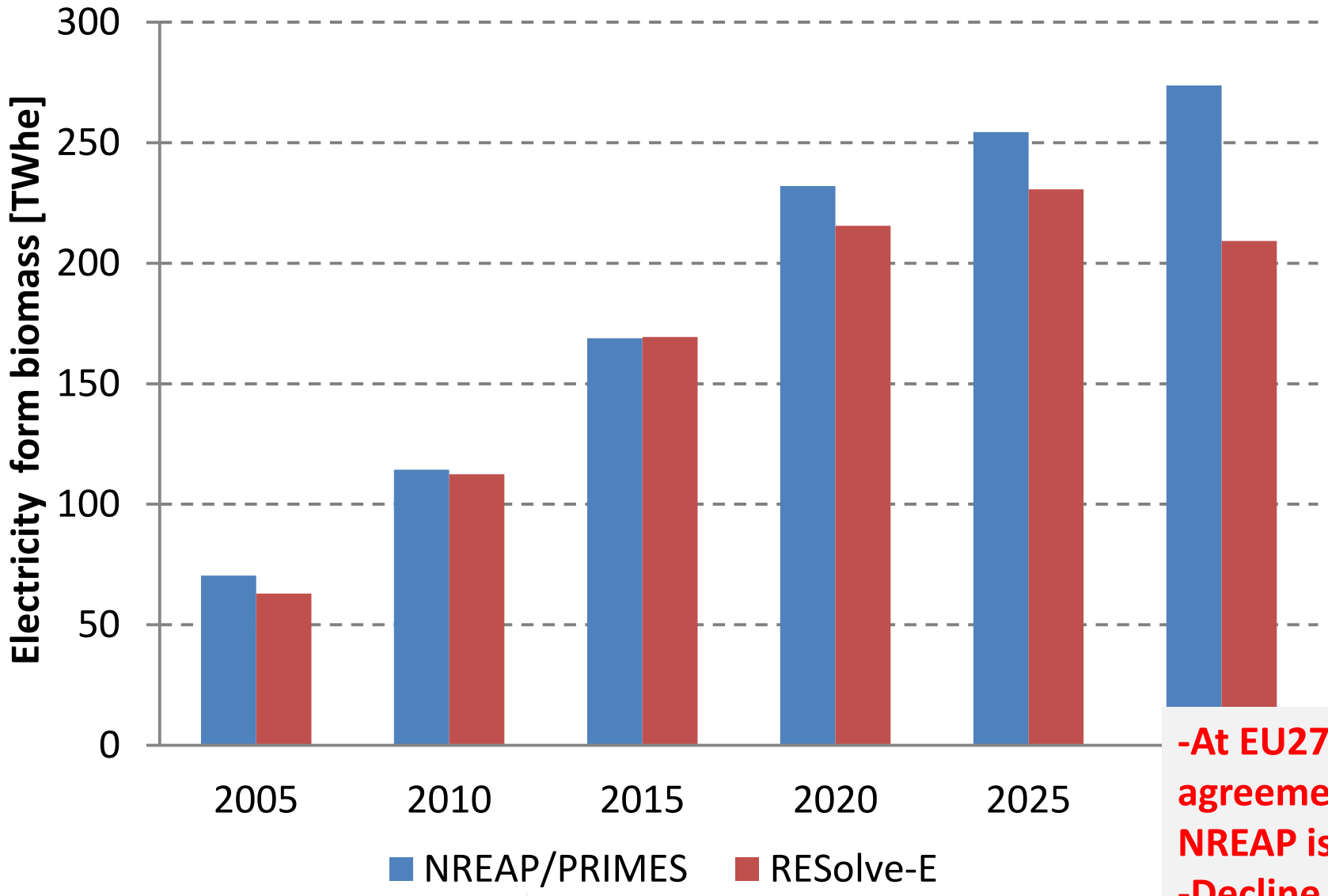
Conclusions/main results (2)

- Electricity sector: After 2025 a decline in bio-electricity production is seen. Main reasons: decline of cheap potential and competition with other RES-E options
- Heat sector: Importance of residential sector may decline, while industry sector may increase
- Biofuels: 2G technologies will play an important role in 2030, but depends a lot on 1G imports
- Role of CHP will increase

Reference scenario: results for RES-E from RESolve-E

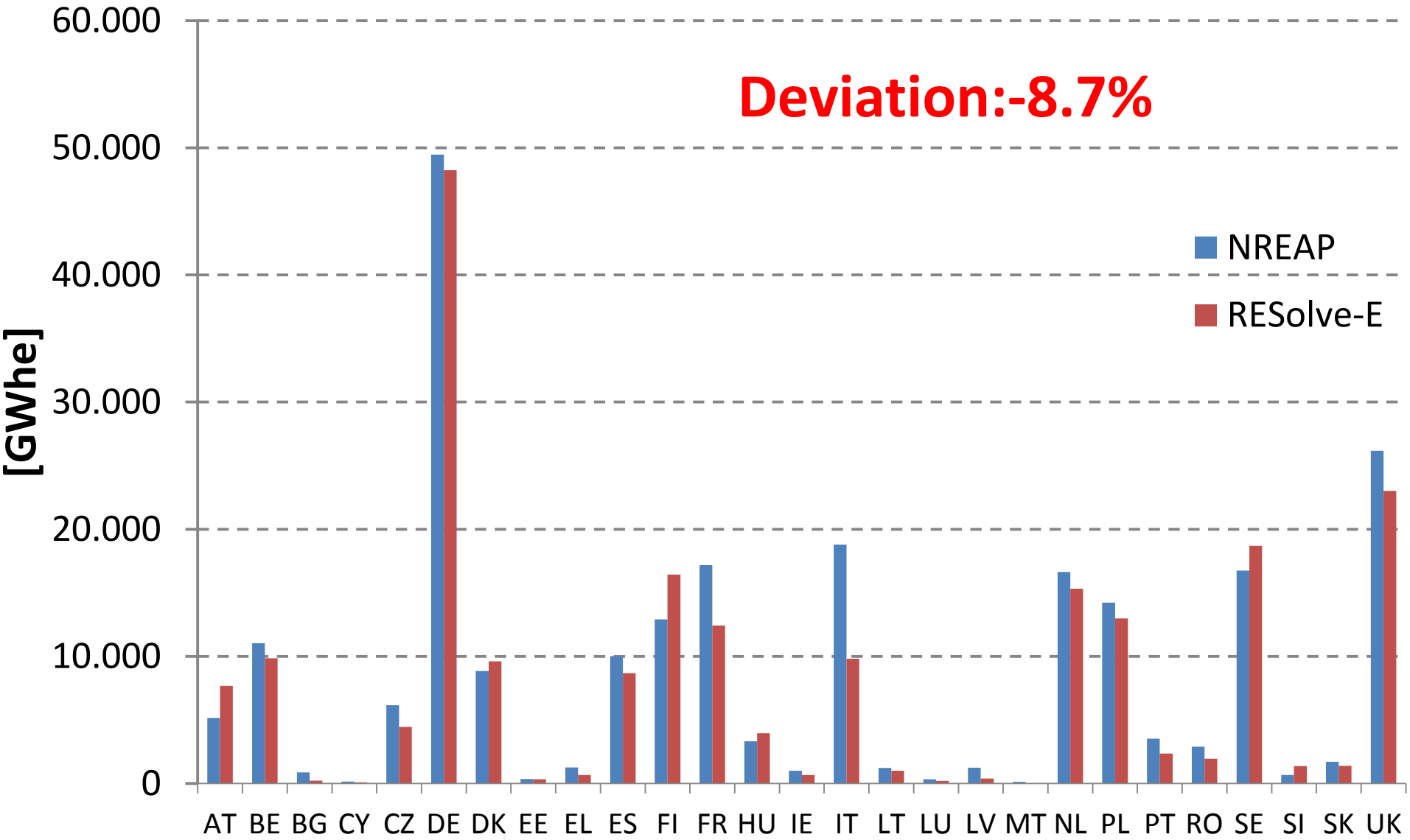


Reference scenario: results RES-E



-At EU27 level agreement with NREAP is quite ok
-Decline after 2025

Reference scenario: results RES-E 2020



What causes RES-E deficits* in 2020?

INTELLIGENT ENERGY EUROPE

Country	[%]	Type	Support /price	Ambitions /growth
BG	≥75%	S,G		
CY	≥25%	G		
CZ	≥25%	G		
EL	≥25%	G		
FR	≥25%	S,G		
IE	≥25%	S		
IT	≥25%	G,L		
LT	≥15%	S		
LU	≥25%	S,G		
LV	≥50%	S,G		
MT	≥75%	S,G		
PT	≥25%	L		
RO	≥25%	S,G		
SK	≥15%	G		

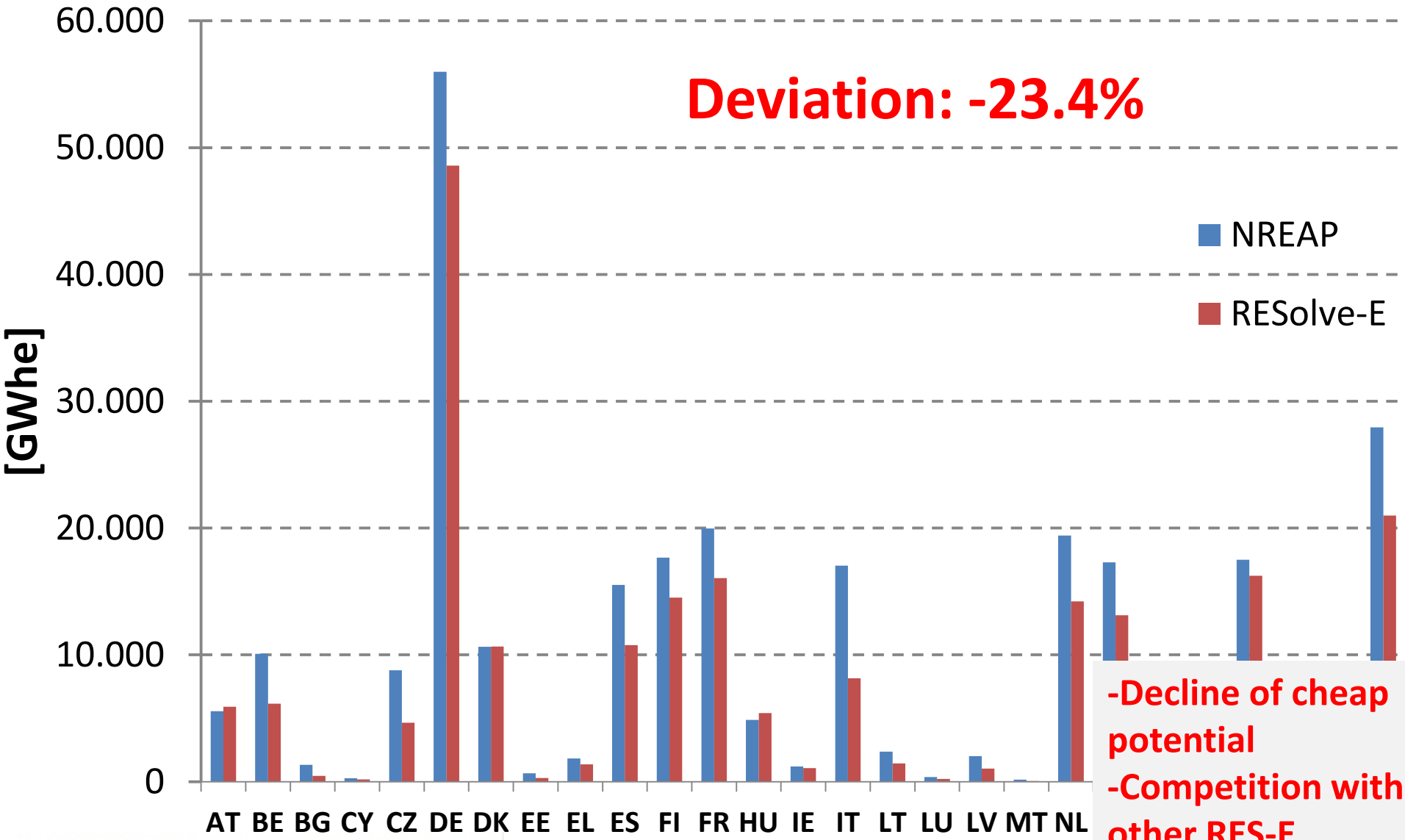
S: solid
G: digestable
L: liquid

Support levels/prices

NREAP ambitions/growth/ barriers

*deficit > 15%

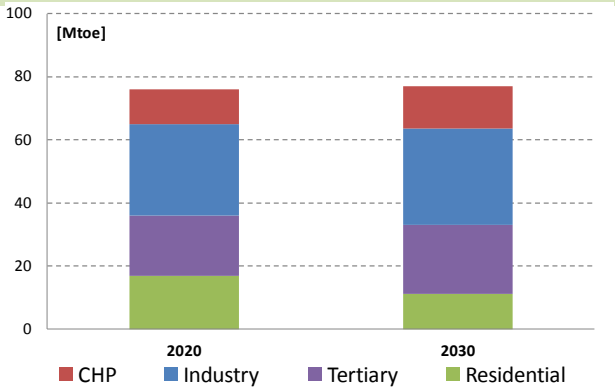
Reference scenario: results RES-E 2030

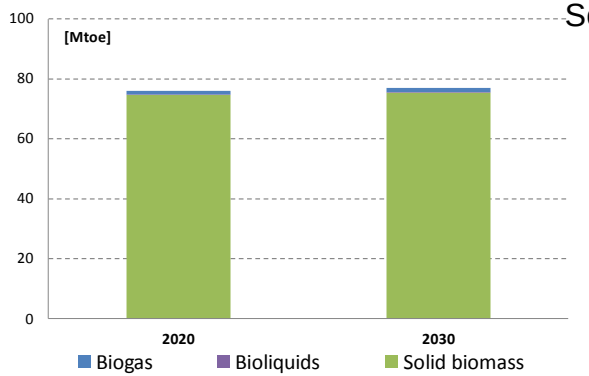


-Decline of cheap potential
-Competition with other RES-E options

Biomass penetration in heat sector

	2010		2020		2030	
	Mtoe	Share	Mtoe	Share	Mtoe	Share
Residential	24.9	47%	16.8	22%	11.2	15%
Tertiary	7.6	14%	19.2	25%	21.9	28%
Industry	14.6	28%	28.9	38%	30.5	40%
CHP	5.8	11%	11.1	15%	13.4	17%
Total	53.0	100%	76.0	100%	76.9	100%





Source: RESolve-H

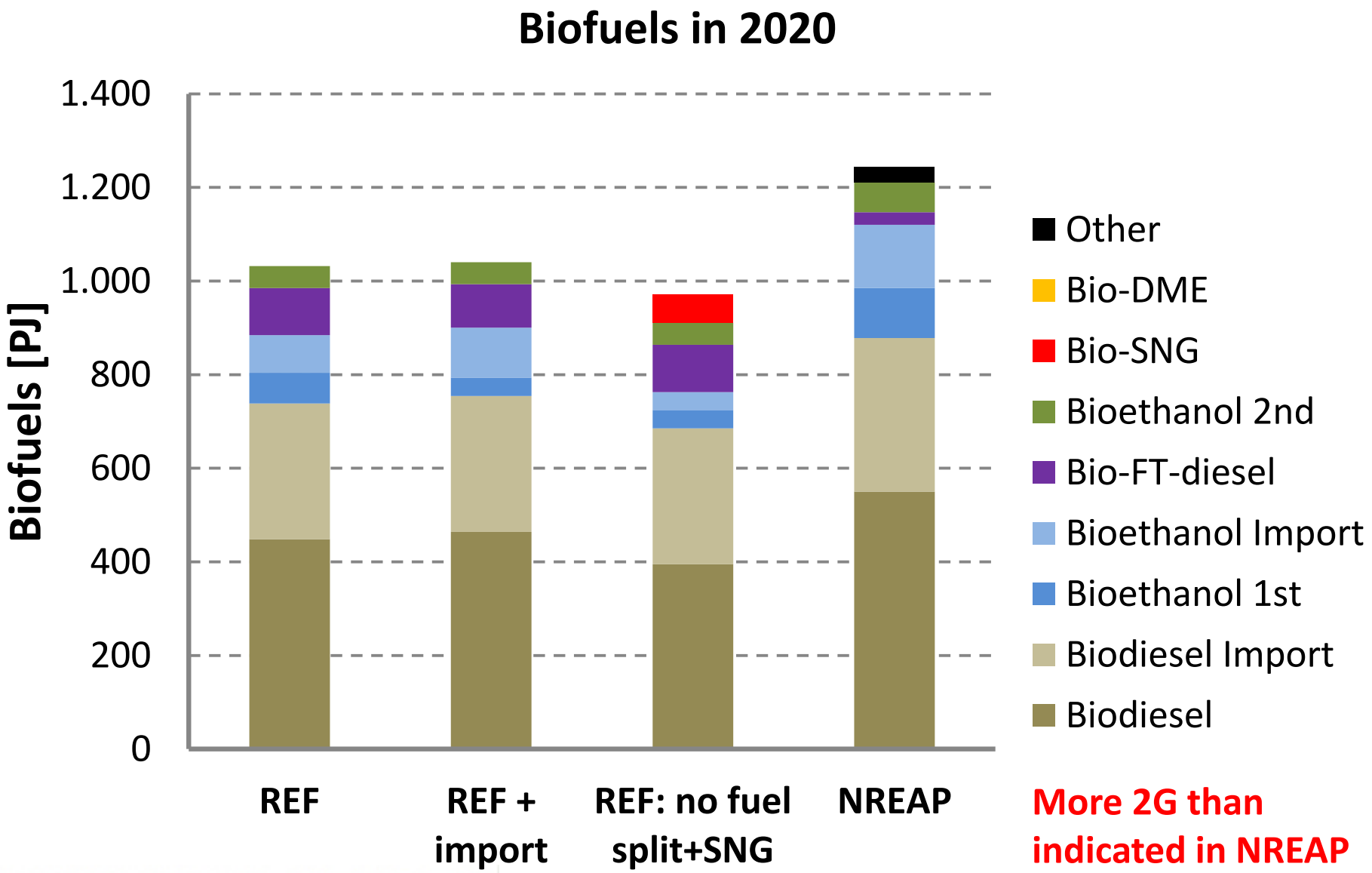
- *Use of biomass in heat sector is expected to grow*
- *CHP will become more important for supplying heat*
- *Importance of residential sector may decline while industry sector may increase*
- *Opportunities exist in tertiary sector*
- *Solid biomass expected to remain most important energy carrier*

Heat: comparison to NREAP

	RESolve-H [Mtoe]	NREAP [Mtoe]	Difference
PL	4.1	4.6	-11%
IT	4.6	5.3	-13%
DE	7.4	9.0	-17%
RO	3.1	3.8	-19%
DK	1.9	2.5	-24%
LU	0.0	0.1	-40%
BE	1.1	1.9	-42%
EL	0.6	1.2	-52%
LV	0.5	1.3	-66%
EE	0.2	0.6	-66%
IE	0.1	0.5	-74%
LT	0.2	1.0	-76%

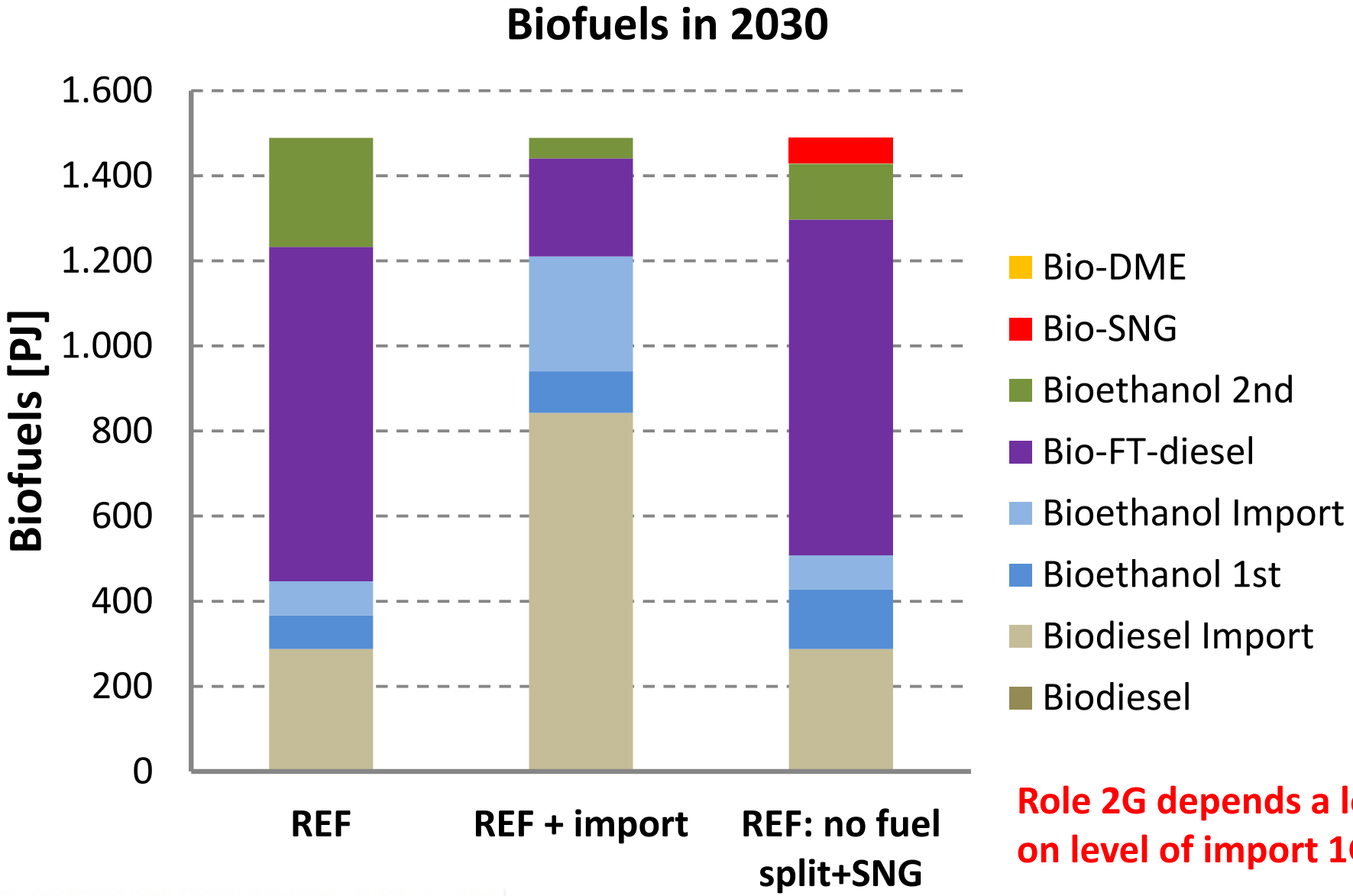
- *RESolve-H penetration in REF comparable to NREAP, average REF EU27 6% lower than NREAP*
- *Some countries may experience lower penetrations compared to NREAP 2020, mainly because of cost/benefit ratio: Belgium, Germany, Denmark, Italy, Luxembourg, Malta, Poland*

Biofuel consumption in the Reference scenario



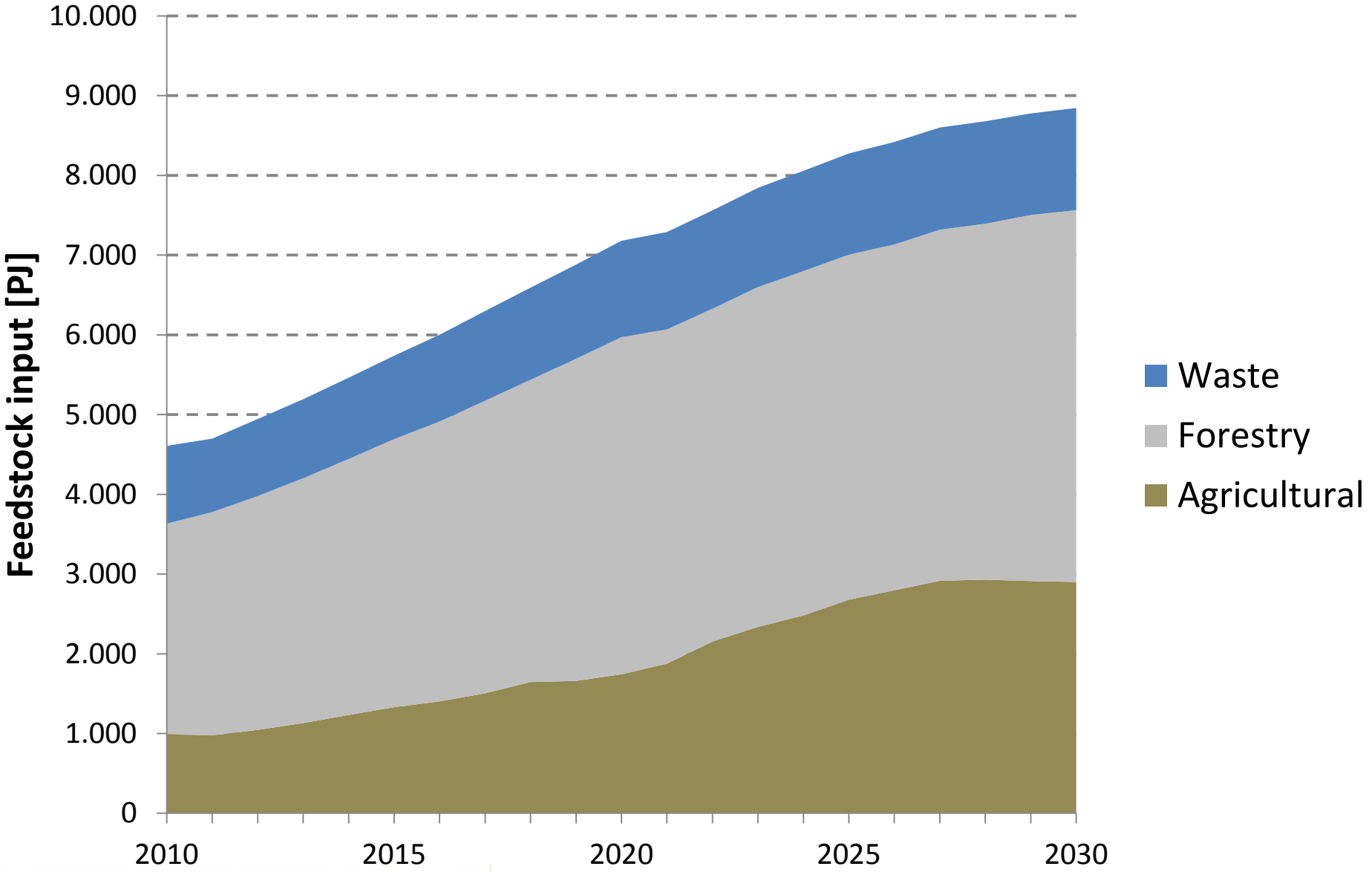
More 2G than indicated in NREAP

Biofuel consumption in the Reference scenario

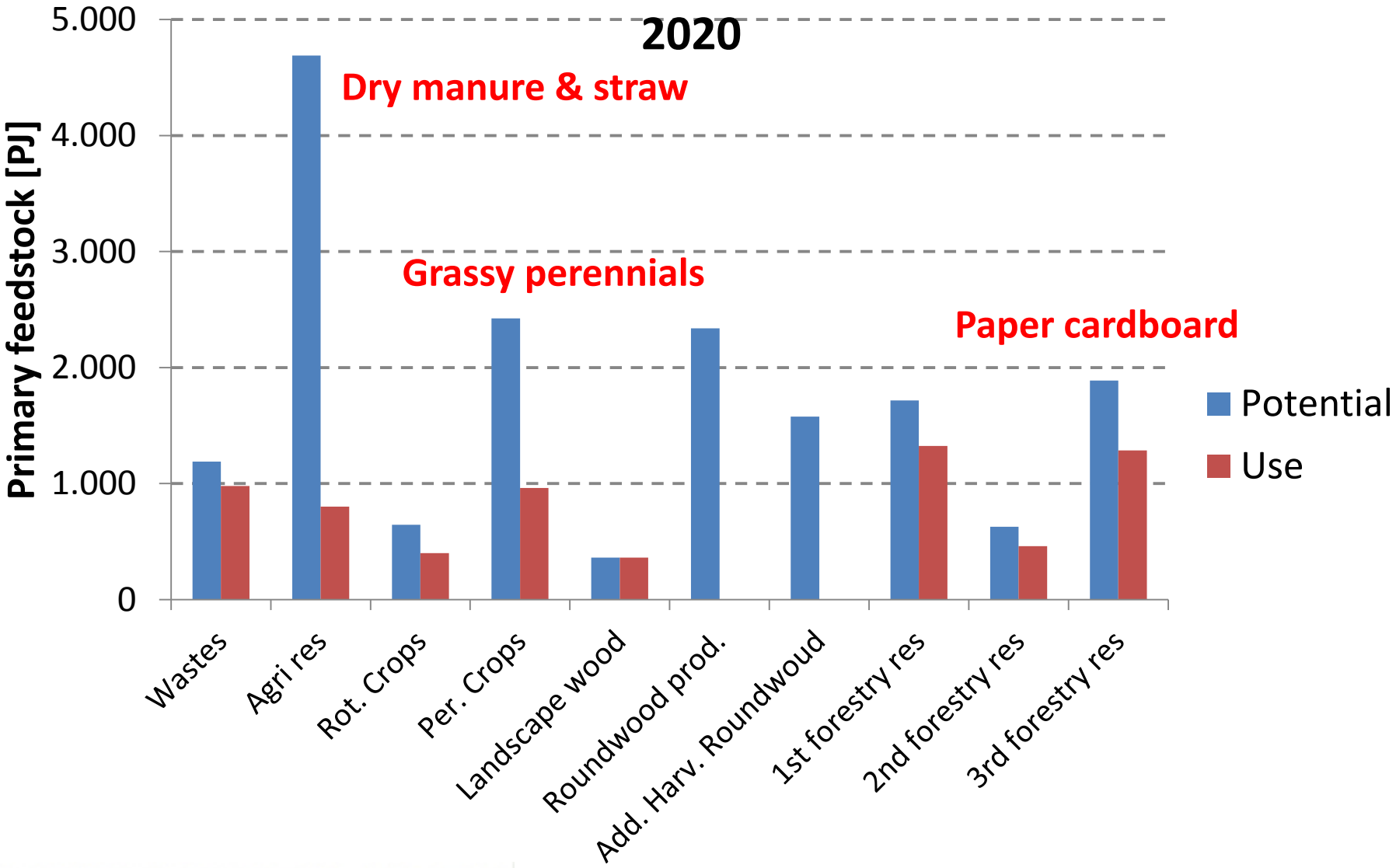


Role 2G depends a lot on level of import 1G

Reference scenario: Feedstock use - overview



Reference scenario: Feedstock potentials vs use



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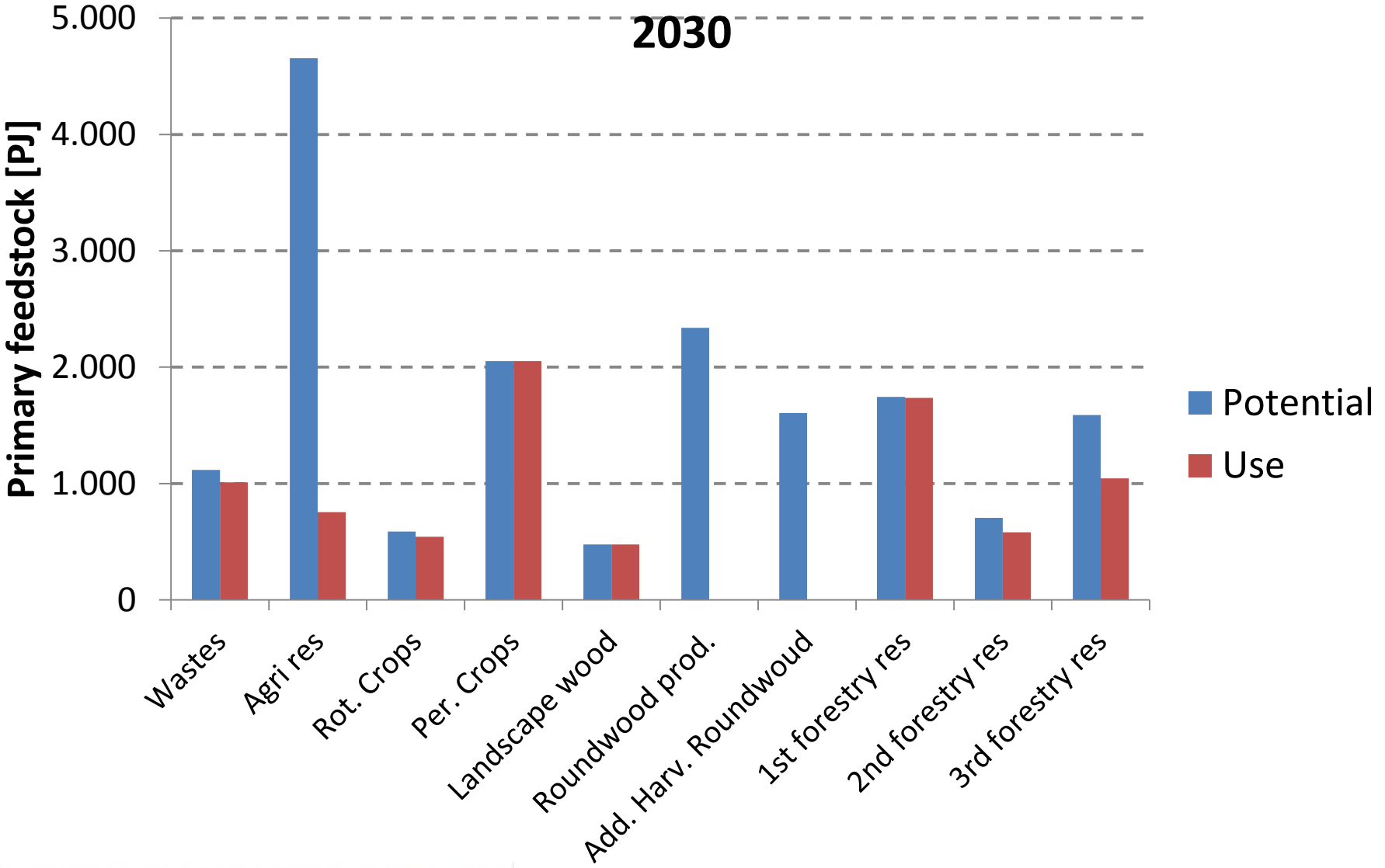
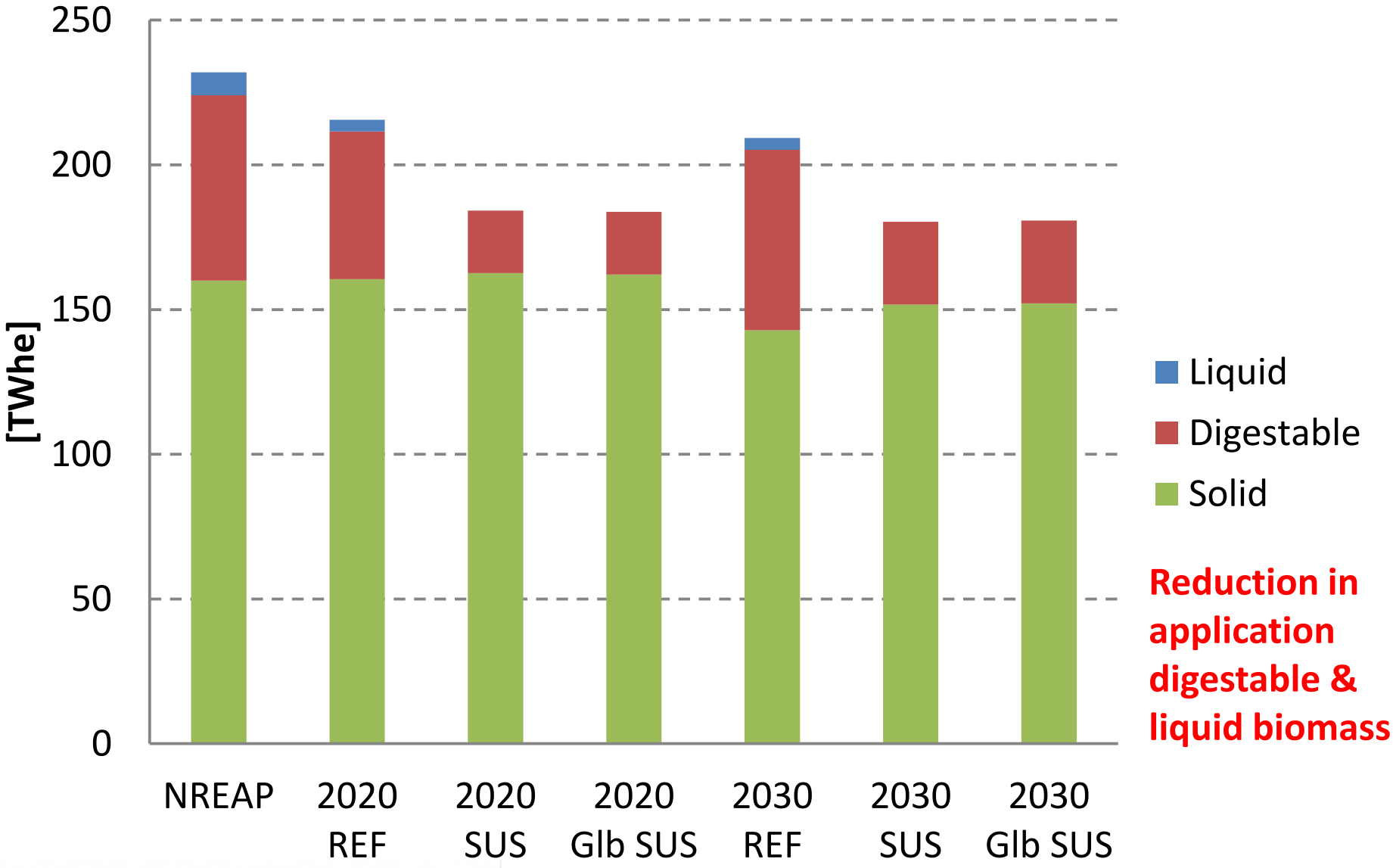
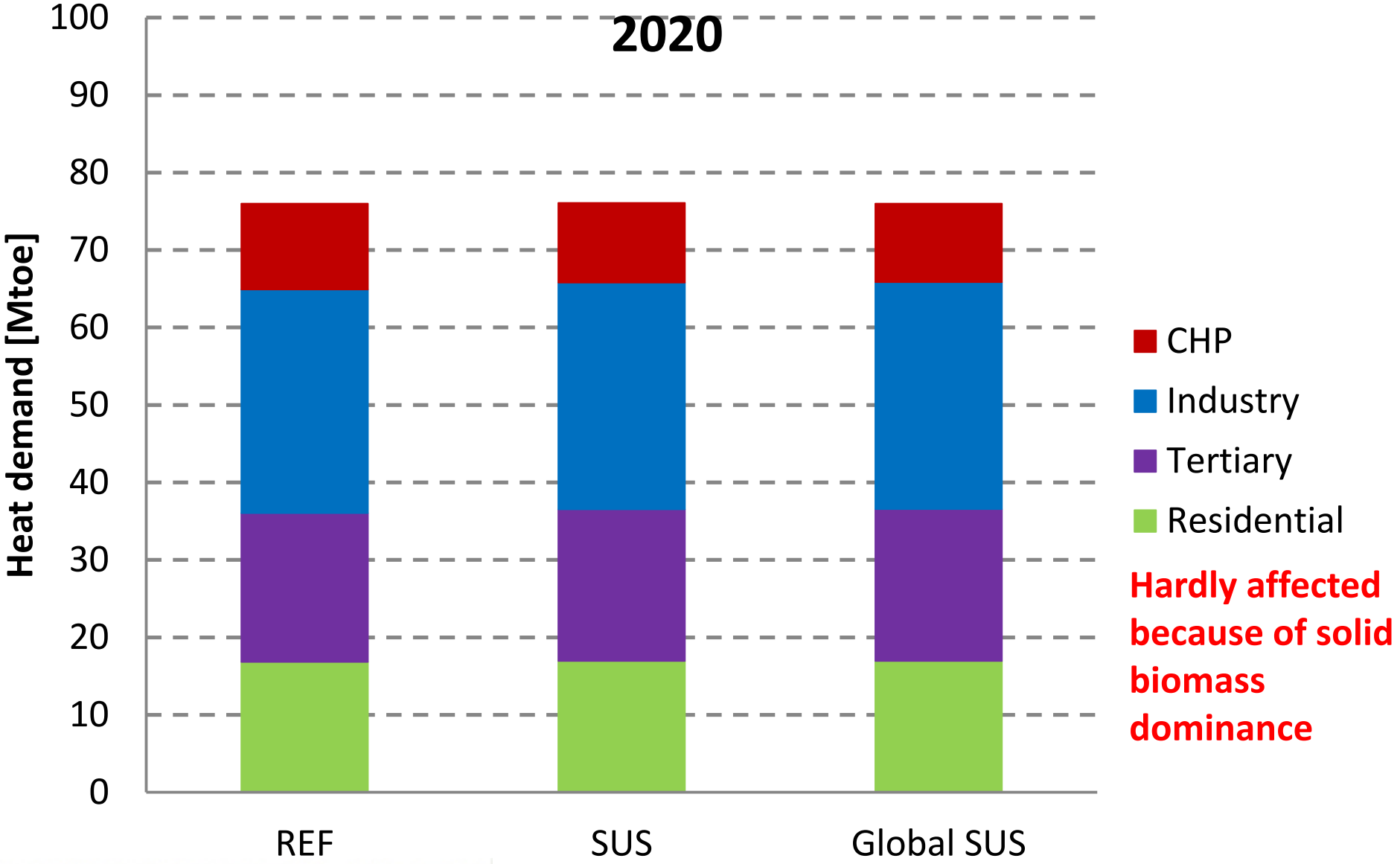


Applying sustainability criteria to RES-E



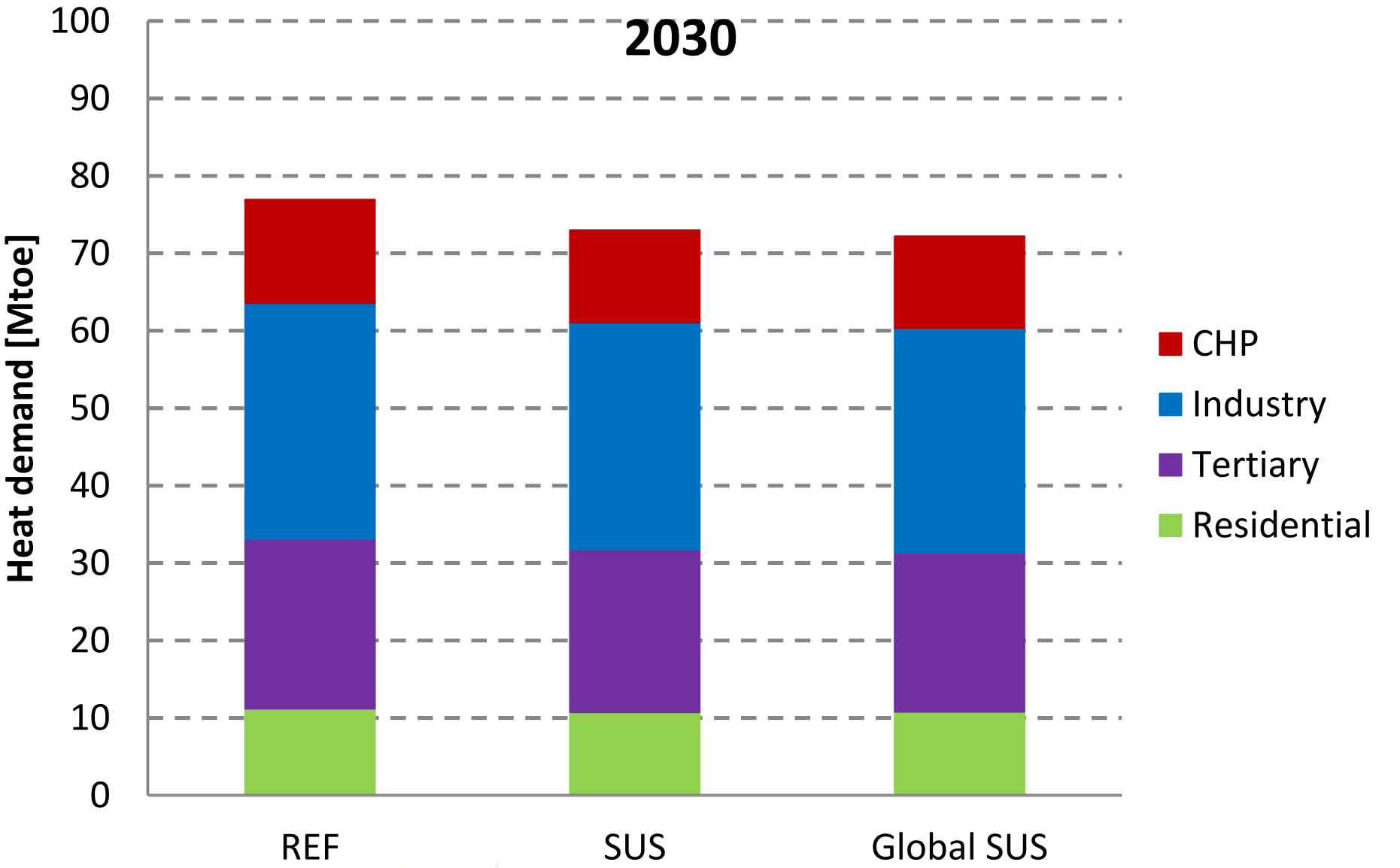
Reduction in application digestable & liquid biomass

Applying sustainability criteria to RES-H

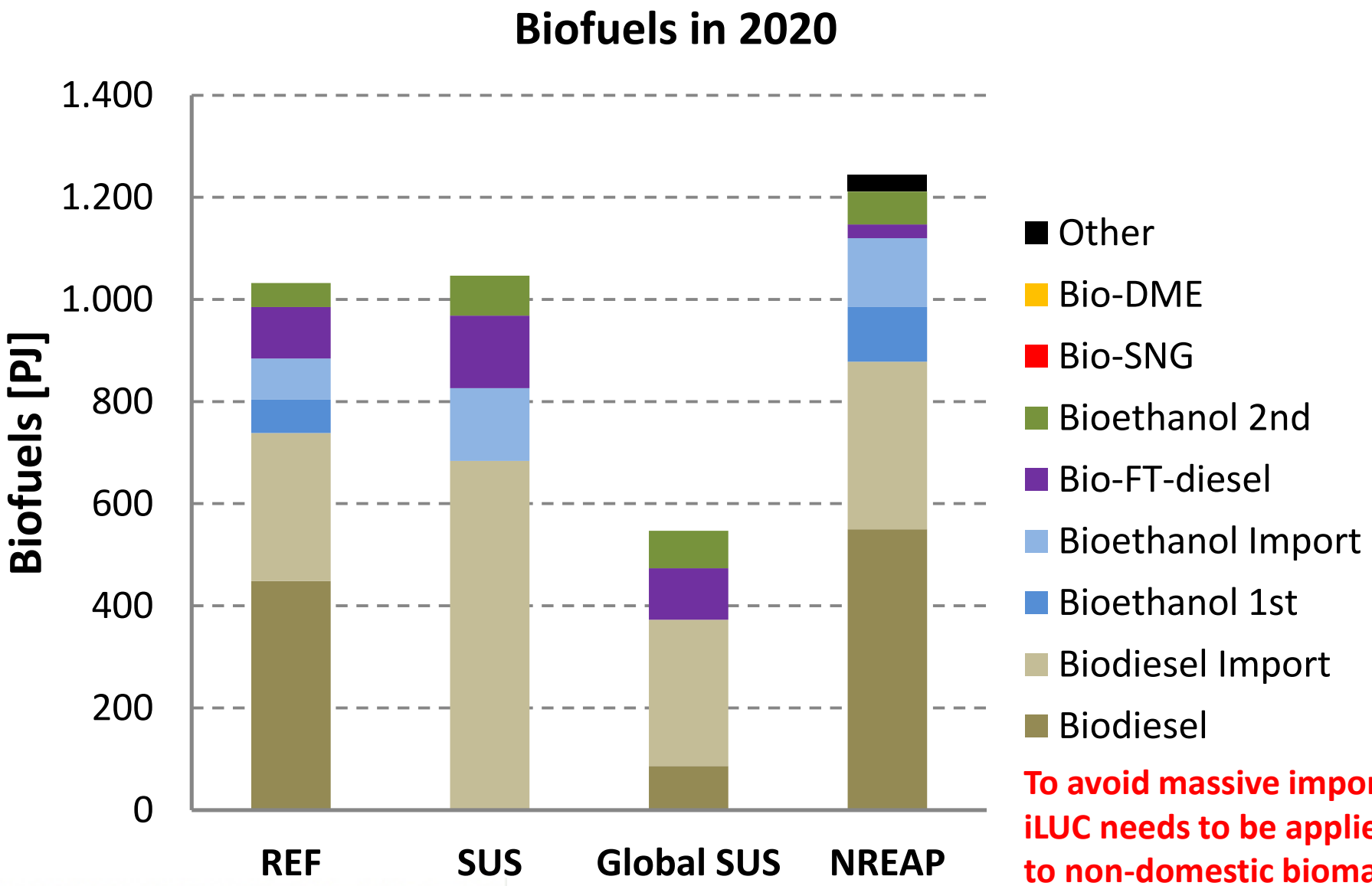


Hardly affected because of solid biomass dominance

Applying sustainability criteria to RES-H



Effect of sustainability on biofuel consumpton



To avoid massive imports: iLUC needs to be applied to non-domestic biomass as well

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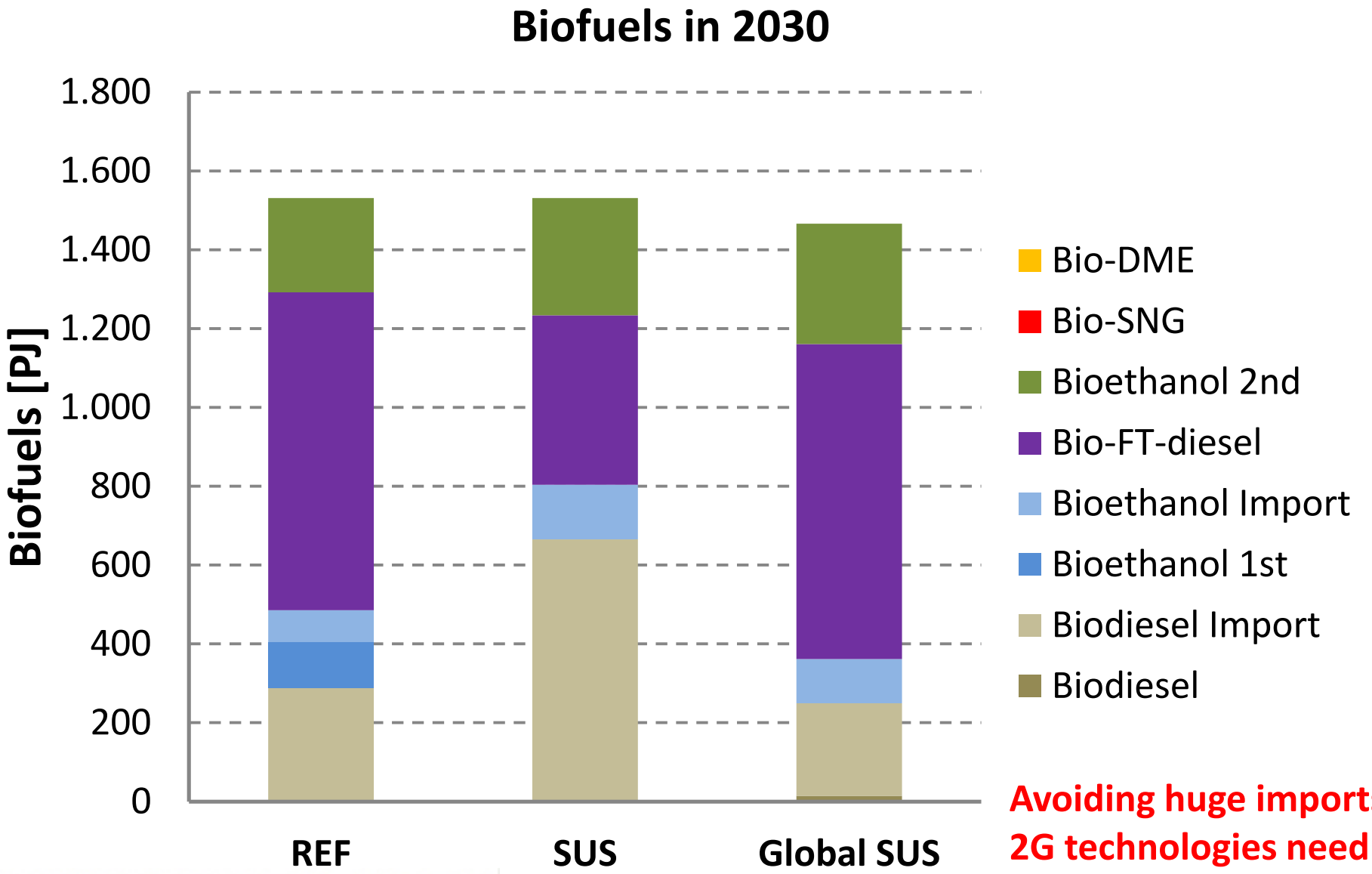
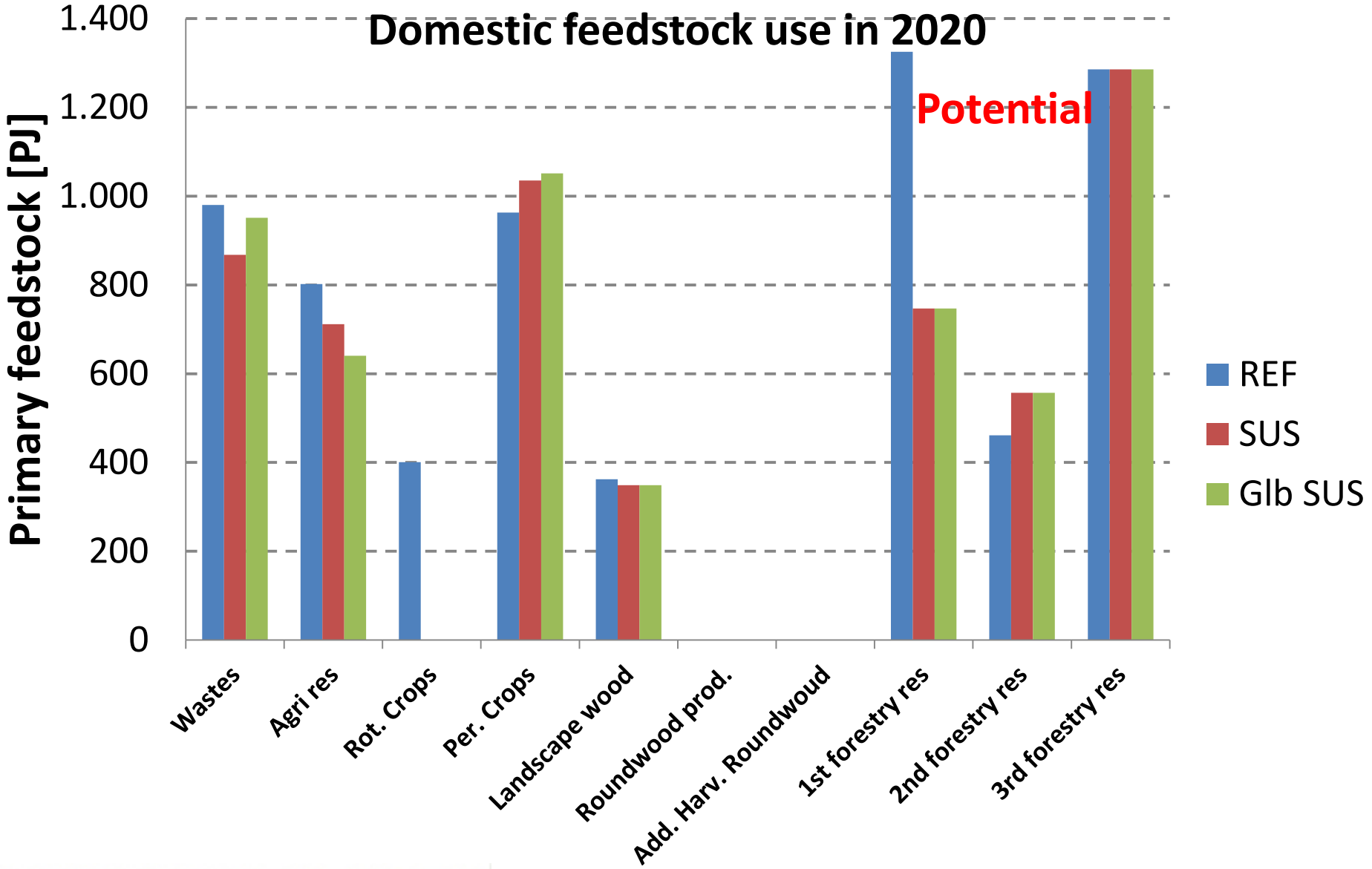


Avoiding huge imports: 2G technologies need an important role

Effect of sustainability on feedstock use



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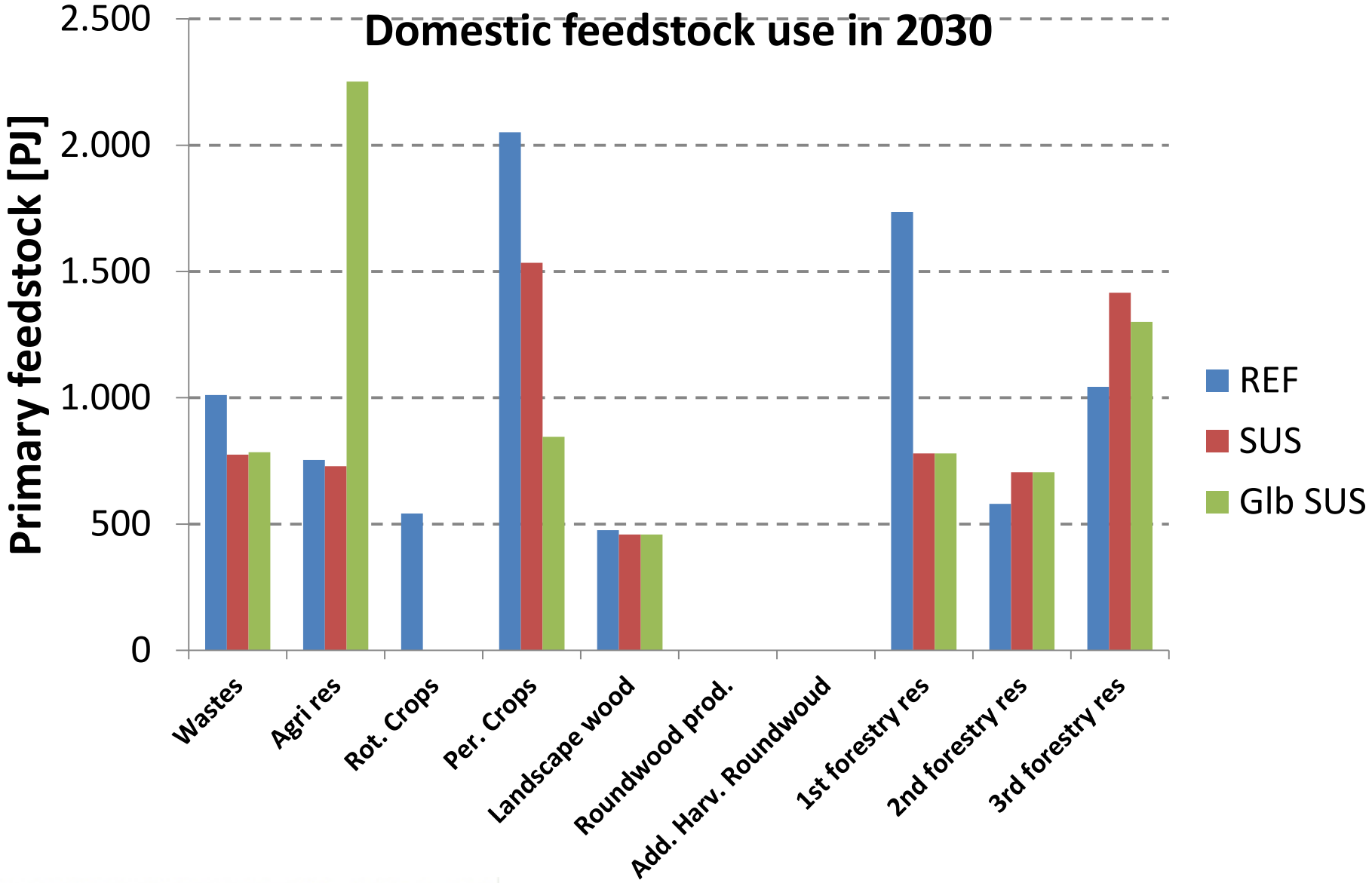
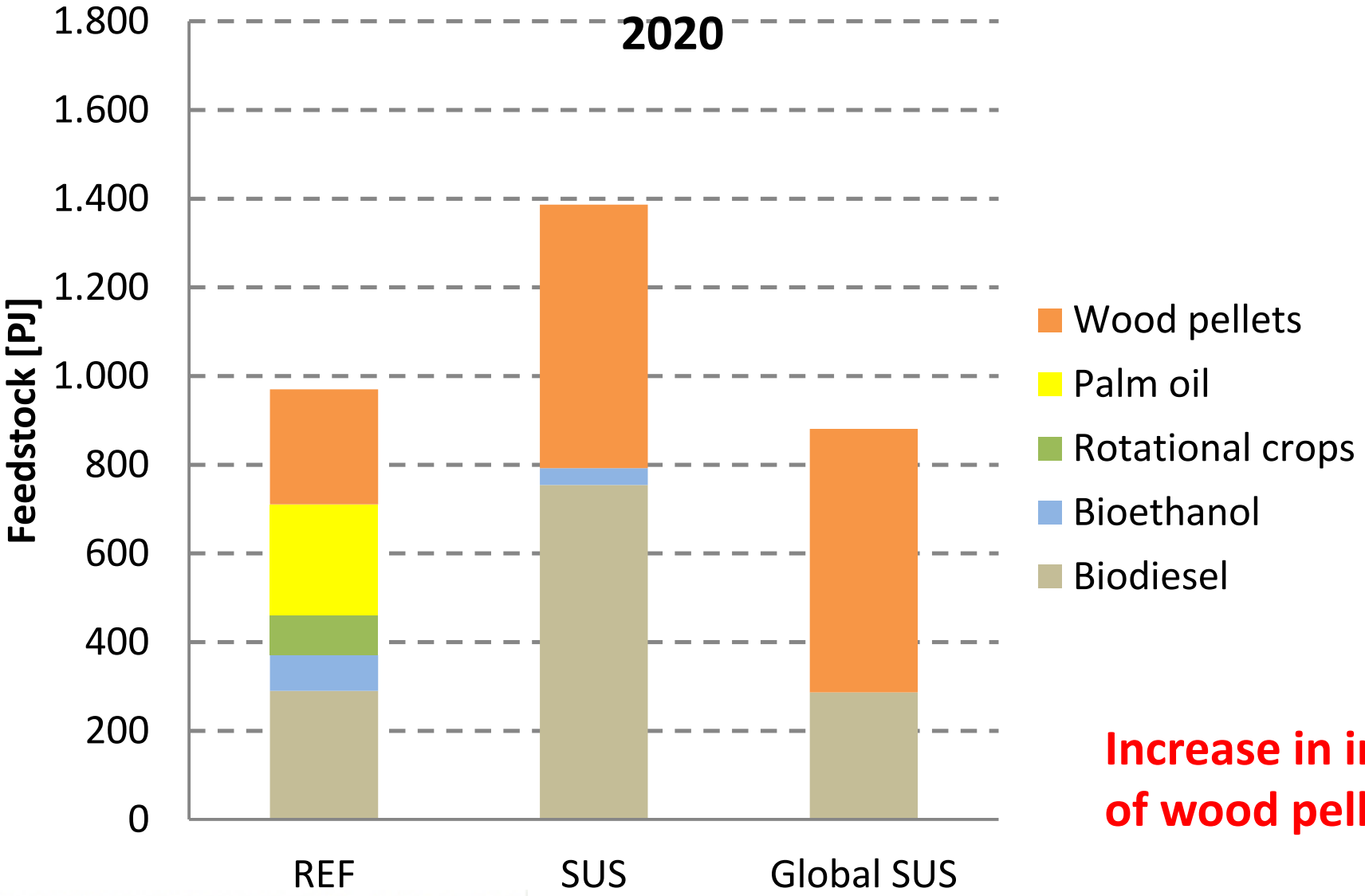
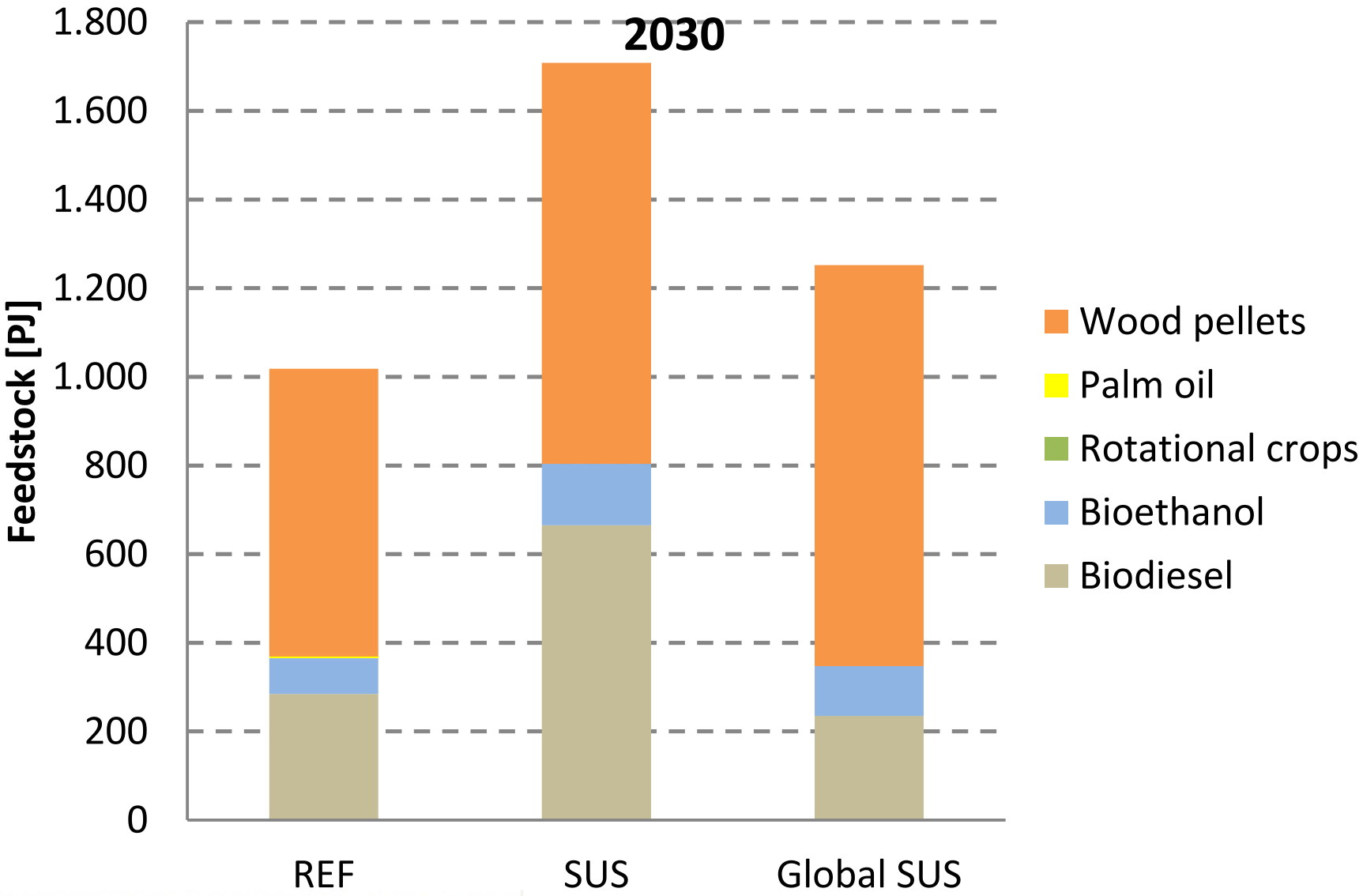


Effect sustainability on imports



Increase in import of wood pellets

Effect sustainability on imports



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Questions?