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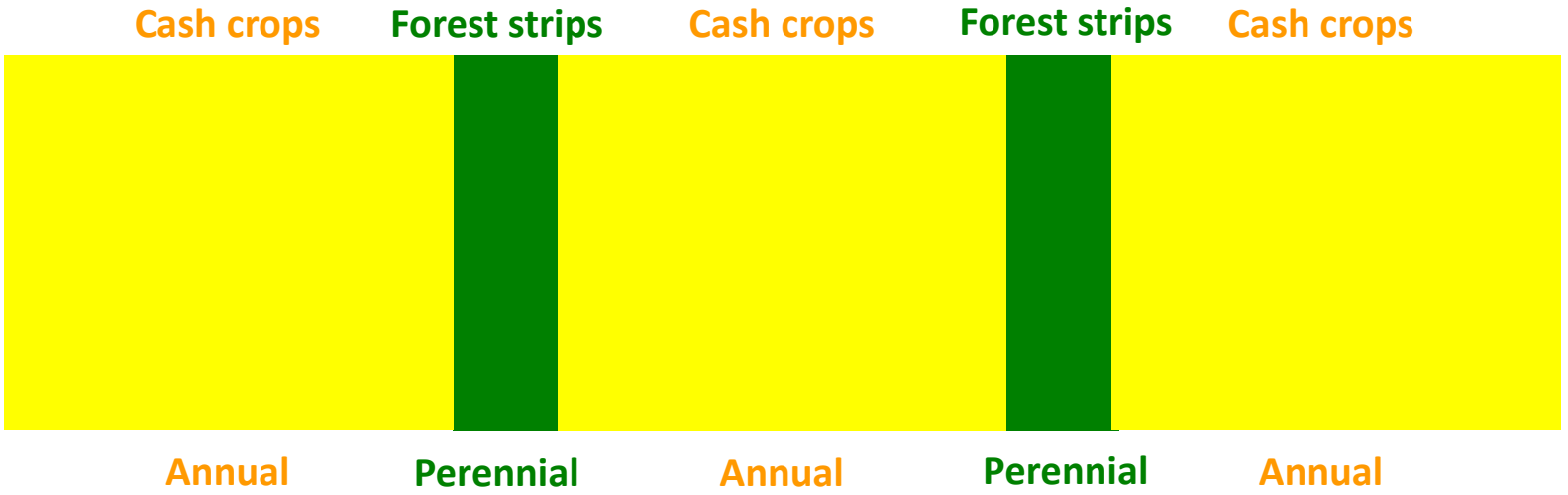
Environmental Economic Analysis of Agroforestry Systems (AFS) in Germany

1. Introduction
2. Problem, research questions and working hypotheses
3. Methodical approach
4. Results
5. Conclusion

AFS are multifunctional systems



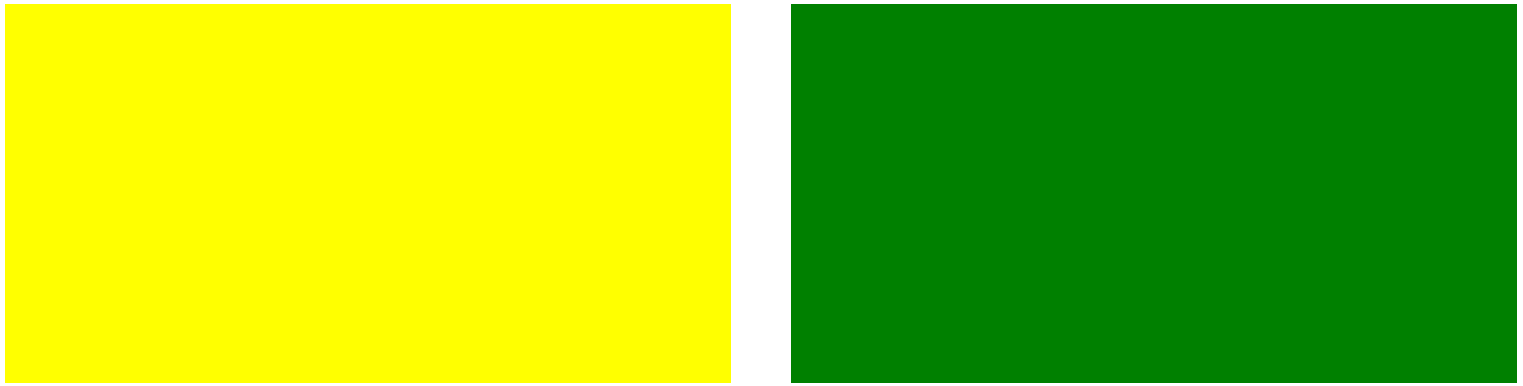
AFS combine food with energy wood production

The process chain of forest strips in AFS

Planting → Weed control → Harvesting → Transportation → Utilisation

Why AFS and not one field of cash crops and one forest plantation?

vs



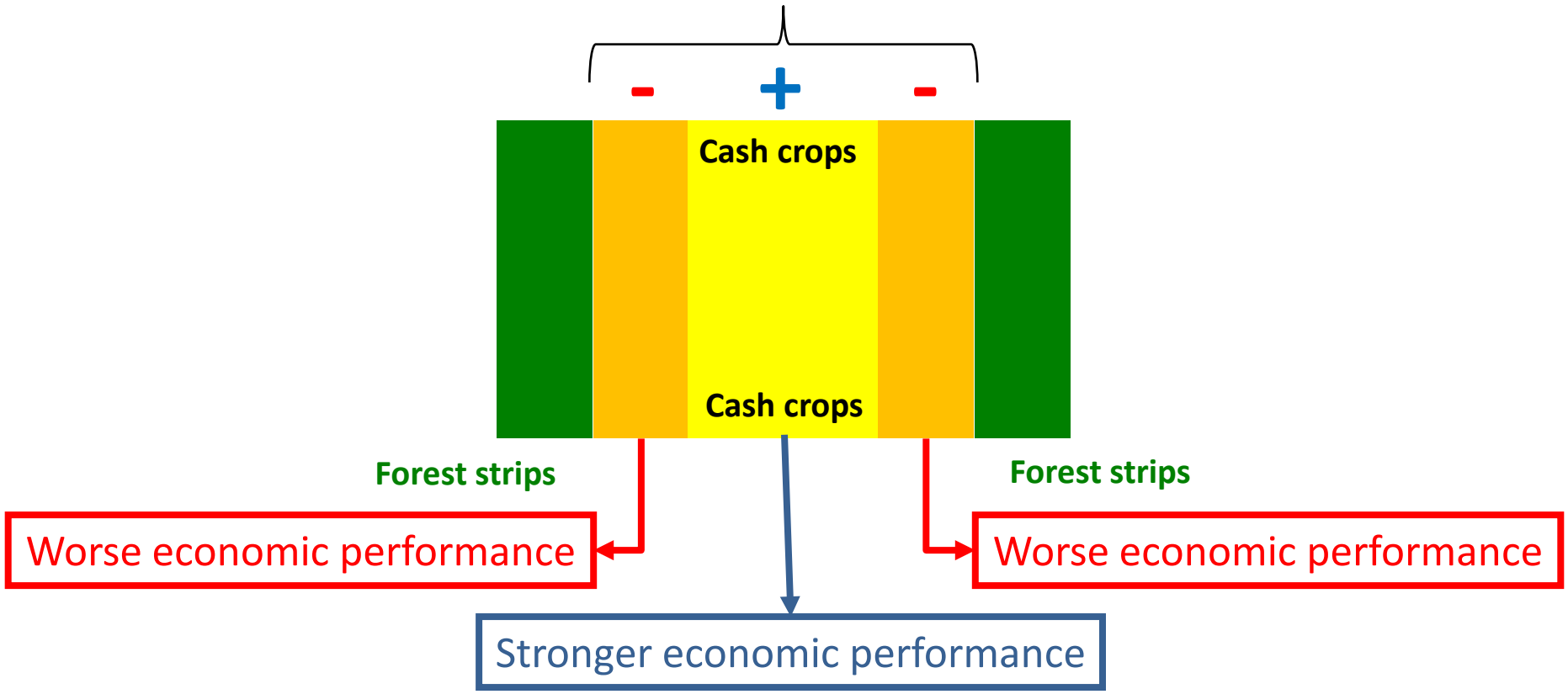
Problem

1. In Germany there is a lack of economic analysis of the yield effects of forest strips on cash crops.
2. Furthermore, there is a lack of connective analysis between economic and ecological performance (CO_{2eq}-abatement costs) at AFS.

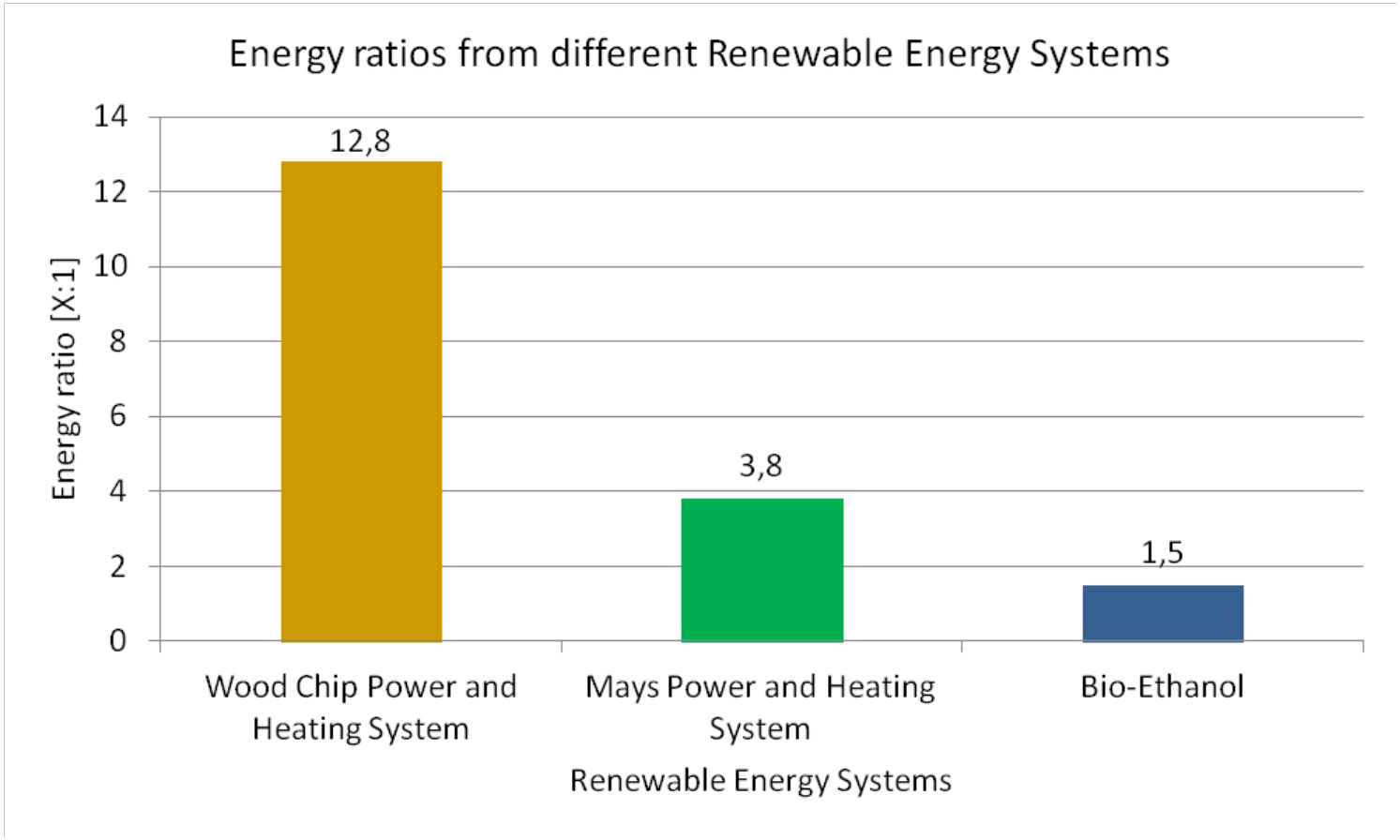
Research questions

1. How do forest strips affect the economic performance of adjacent cash crops?
2. How efficient is it for a national economy to conserve CO_2 by generating electricity from burning woody chips of AFS?

1. Forest strips have a decreasing and an increasing effect on the economy of cash crops.



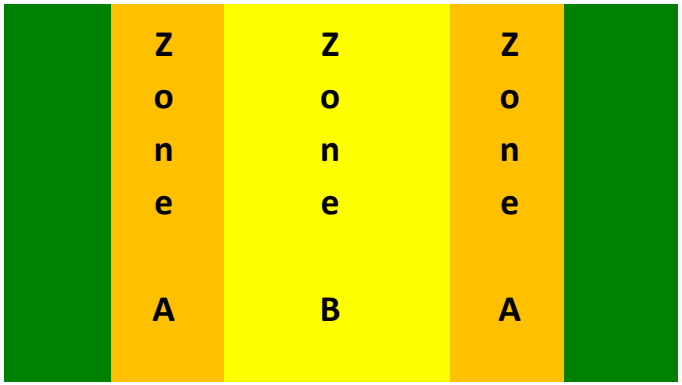
2. The conservation of CO_2 by generating electricity from burning woody chips of AFS is low in comparison to other bioenergy lines.



Quelle: WBA; 2007

1. How do forest strips affect the economic performance of adjacent cash crops?

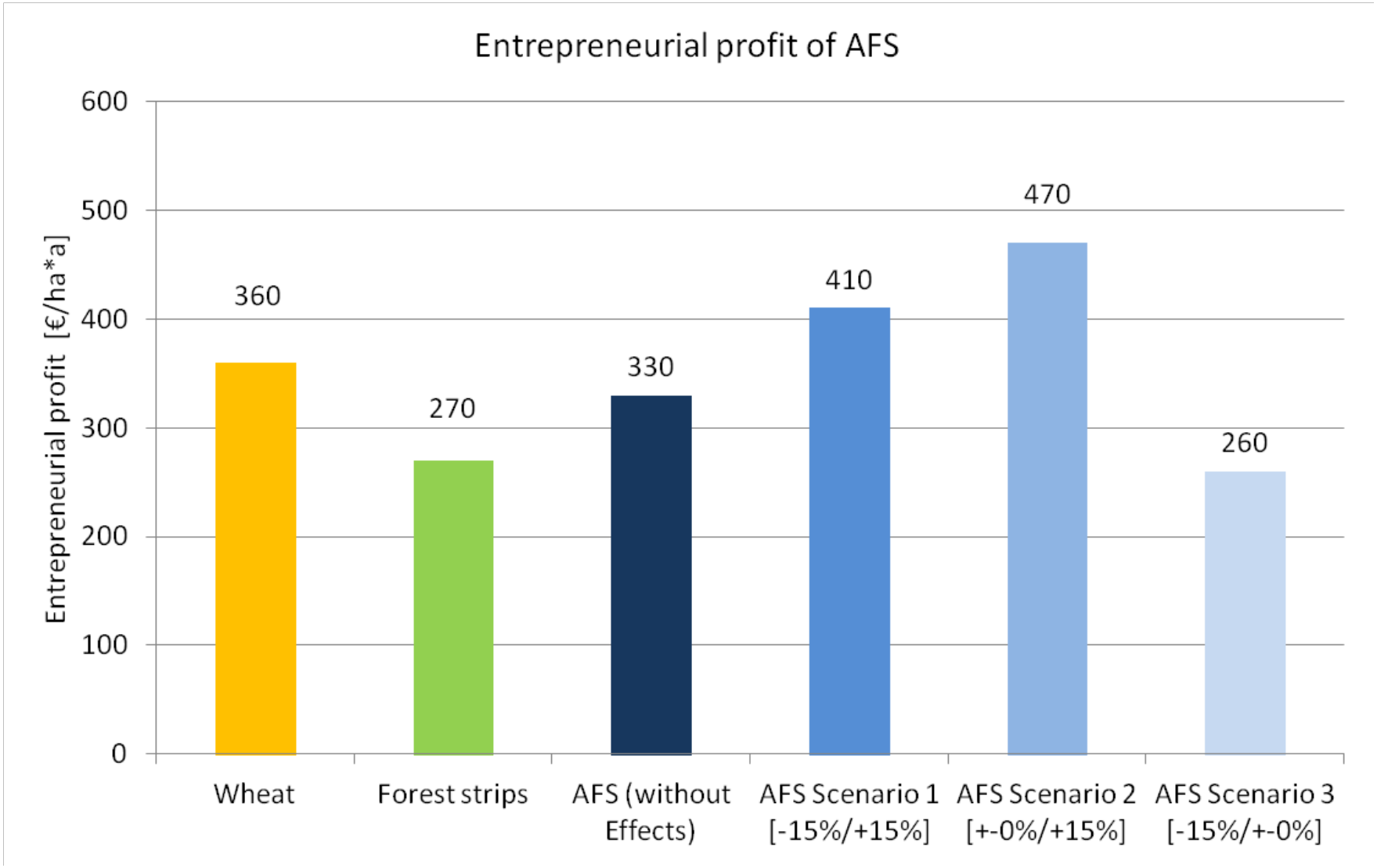
a) Assumption of the yield **in- / decreasing** effects



Scenario	Zone A	Zone B
1	-15 %	+15%
2	+-0%	+15%
3	-15%	+-0%

b) Calculation of entrepreneurial profit (full costs minus profit) [€/ha*a]

Land utilisation	[€/ha*a]
Wheat (in AFS)	360
Forest strips (in AFS)	270
AFS (wheat and forest strips) Without effects	330

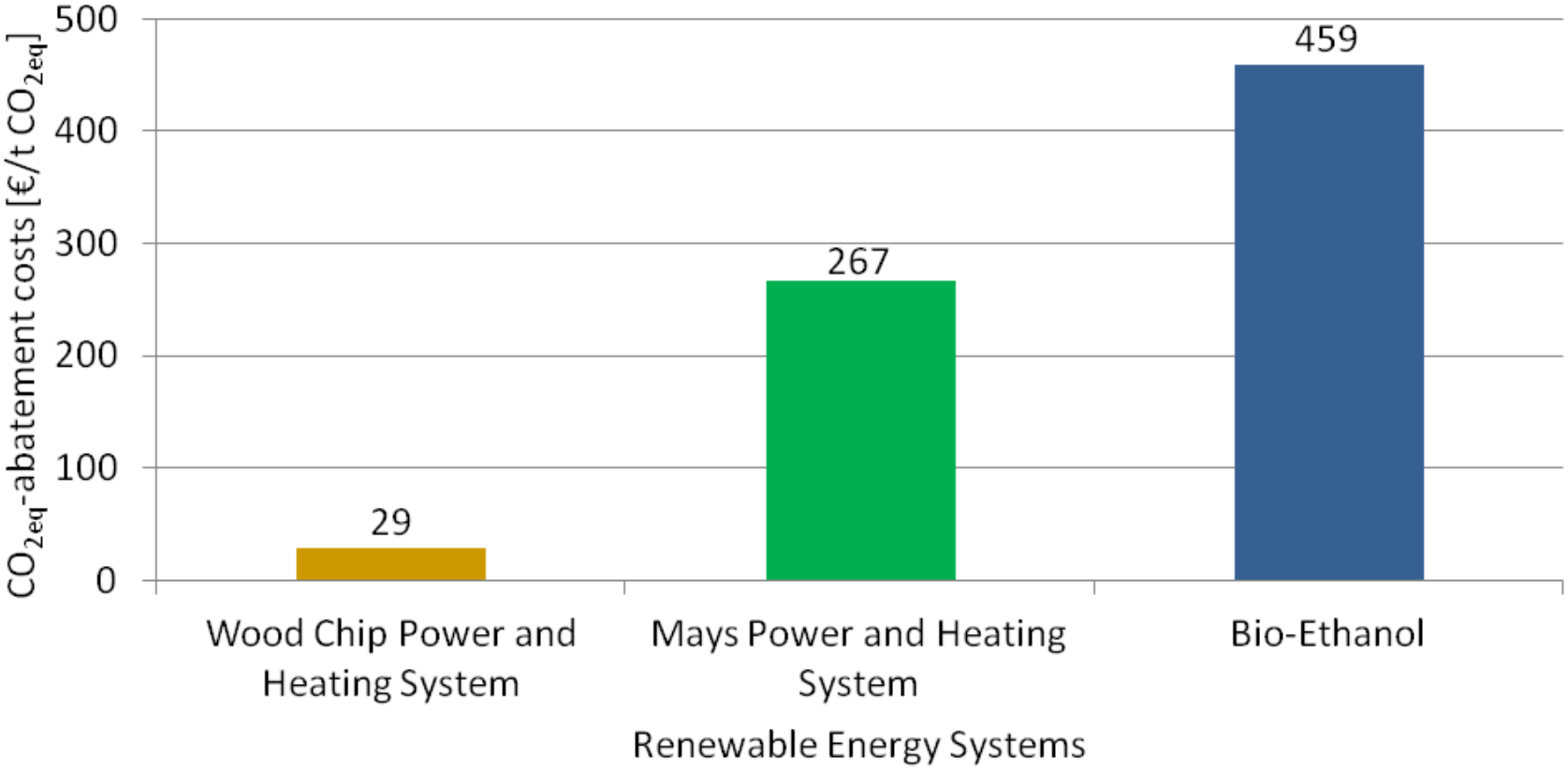

Entrepreneurial profit of AFS
Entrepreneurial profit [€/ha*a]
600
500
400
300
200
100
0
360
270
330
410
470
260
Wheat
Forest strips
AFS (without Effects)
AFS Scenario 1 [-15%/+15%]
AFS Scenario 2 [+-0%/+15%]
AFS Scenario 3 [-15%/+-0%]

Research question

2. How efficient is it for an national economy to conserve CO_2 by generating heat and electricity from burning woody chips of AFS?

a) Balancing of costs and greenhouse gases from cradle to heating system

b) Comparison with generation costs and greenhouse gas emissions from generation electricity in Germany



Quelle: WBA; 2007

Conclusion

1. First sensitive analyses showed that possible yield effects have a considerable influence on the economic performance of adjacent cash crops as well as on the whole AFS. From an economic point of view it makes only sense to combine two different forms of land use if there are synergy effects.

2. Because of the low abatement costs the generation of power and heat from burning woody chips out of AFS is a cheap alternative for a society to reduce CO_2 emissions.

Thank you for your attention!

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