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Biofuel policies for dynamic markets

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The role of risk-mitigating policies in promoting 2nd gen biofuels

INTRODUCTION

Despite important technological advances, second generation biofuels are largely still at a demonstration stage. One of the main barriers to overcome towards a more significant market share are the perceived risks of biofuel projects. Higher perceived risks result in higher cost of capital. This influences the rate of market deployment and consequently affects their technological learning curve and further cost reductions. Different support policies can mitigate some of the risks that are preventing advanced biofuels access to cheaper finance sources and support their market expansion.

STUDY GOALS

1. **Understand the risks related to first and second generation biofuel projects.**
2. **Evaluate their impact on the cost of capital.**
3. **Assess what policy options can overcome the initial investment hurdle for advanced biofuels.**

MAIN CONCLUSIONS

- Perceived technology risks cause **the cost of capital for advanced biofuels to be much higher than for conventional ones**. This is hindering their market deployment.
- **Initial investment subsidy in combination with double counting** are the most cost-efficient policy options to overcome the initial investment hurdle for 2nd gen biofuels. **BUT !!!**
- Double counting reduces the size of the biofuel market - To fulfil its purpose best, it must be discontinued in the short-middle term.
- **By 2020 we can achieve ~20% 2nd gen in the biofuel mix at reasonable policy cost (>1 billion €).**

METHODOLOGY & RESULTS

Survey
of experts in the field of biofuel financing

Risk profiles for 1st & 2nd generation biofuels

Quantified financial parameters:
-Debt/equity share
-Return on equity
-Interest rate

Risk Type	1st generation	2nd generation
Technology risk	Low-medium	High
Market risk	High	Medium
Regulatory/Policy risk	High	Medium
Geopolitical risk	Medium	Low
Stakeholder acceptance	High	Low

FINANCIAL PARAMETERS	1st gen	2nd gen
Short term		
Level of debt financing	50-80%	0%
Interest rate	6.5-9%	n.a.
DSCR	1.2-2.0	n.a.
Level of equity financing	20-50%	100%
Required return on equity	15-20%	20-30%
WACC	6.6-13.2%	20-30%
Long term	*Same for both*	

Due to its high technology risk, 2nd gen biofuel projects cannot obtain debt finance and need to be financed almost exclusively by venture capital, (safe for grants or investment subsidies) which implies a weighted average cost of capital (WACC) of 20 to 30%, or 3-5 times the cost of capital of 1st gen projects.

Cashflow model
- Input: financial parameters from survey; market prices for biofuels, feedstocks and by-products; investment costs; values of policy support
- Output: WACC for 1st & 2nd gen production facilities

Biotrans model
Input: target biofuel consumption; 10 crop/non-crop raw materials; 12 conversion steps; 7 biofuels; 30 countries and a 'rest of world' category; policy measures

- Output: Optimized biofuel mix to reach target under given constraints and policy support

Result
Evaluation of market deployment of second generation biofuels under different policy support measures

Different policy options/combinations achieve very different levels of 2nd gen production and market share. Policy costs differ very significantly.

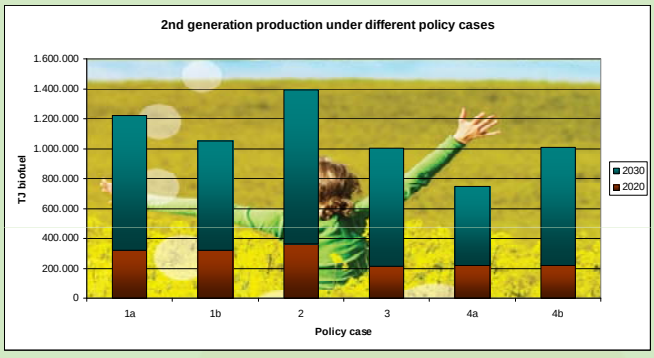
The most effective policy options are not also the most efficient.

Policy scenarios

Case	Policy option(s)
1a	Continuous (high) investment subsidy
1b	Investment subsidy gradually phased-out
2	Initial investment subsidy + parallel partial tax break
3	Initial (high) investment subsidy + subsequent soft loan
4a	Initial (high) investment subsidy + continuous double counting
4b	Initial (high) investment subsidy + double counting discontinued after 2020

Achieving a significant contribution of 2nd gen to the transport fuel mix in the short-mid term will require considerable policy support.

A combination of investment subsidy and tax break achieves the highest production volumes (and market share) for 2nd gen but at a very high policy cost.



Case	Effectiveness (2nd gen market share)		Efficiency (total policy cost in €2005/GJ biofuel)
	2020	2030	2030
1a	☺☺ (~22,0%)	☺☺☺ (~40%)	☹☹ (~15)
1b	☺☺ (~22,0%)	☺☺ (~35%)	☹☹ (~10)
2	☺☺ (~25,0%)	☺☺☺ (~45%)	☹☹☹ (~20)
3	☺ (~14,7%)	☺☺ (~35%)	☹ (~5)
4a	☺☺ (~18,0%)	☺☺ (~30%)	☺ (~2)
4b	☺☺ (~18,0%)	☺☺ (~35%)	☺ (~1)

A combination of double counting and initial investment subsidy can achieve a significant deployment of 2nd gen at the least policy cost.
If discontinued after learning effects have sufficiently lowered the cost of technology, it fulfils its purpose best.