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SDA Bocconi School of Management

Bioplastic : an economic and environmental evaluation

6th of March 2013

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MILANO | ITALY



Establishing a bioeconomy is the European Union road

The road is very difficult and full of many hurdles

That's why we need more and more case studies to show that it is possible to have a successful bioeconomy, able to reach environmental and economic improvements.

The framework

In 2011 Italy has banned plastic shopper sales.

European consumption 100 billion /year  Oil 910.000 tons

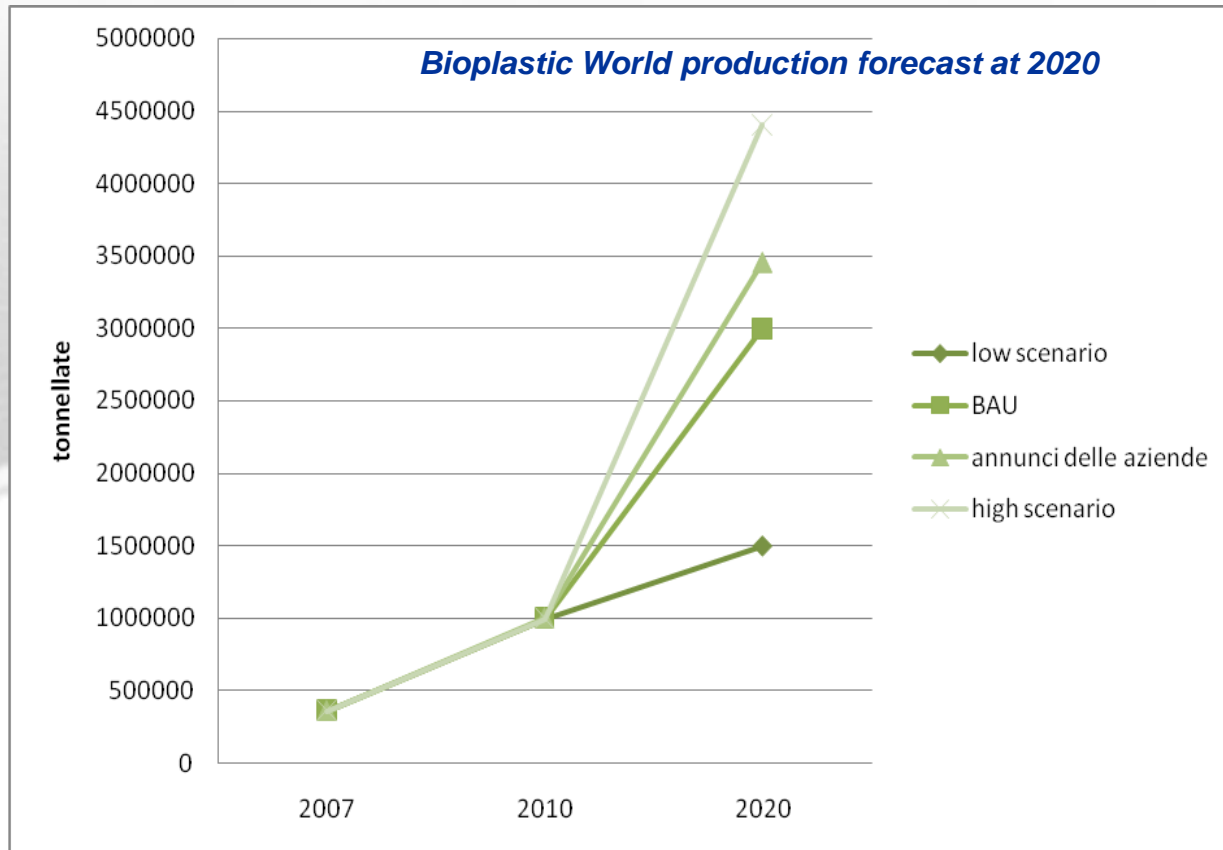
After 2 years it is possible to analyse the first impacts of this regulation, from an economic and environmental point of view.

These are the main goals of this research

The framework:

Plastic vs Bioplastic: worldwide trends

The global consumption of traditional plastic is about 250 ml/t. The worldwide production of bioplastic is about 1 million tonnes, only 0,5% of the plastic global market. In Italy the starch hectares used for bioplastics are less than 0,2% of the entire starch surface, mainly located in marginal areas, unsuitable for food.



Shopper Ban

Film Producers

Plastic film producers industry: the first data after the plastic shopper ban shows an employment reduction, even if it is important underline the increasing role of shopper segment in terms of employment and profitability.

Data for carrier bags segment Italy (<i>PlasticConsult 2012</i>)	2010	2011	variazione %
Total revenues (incl carrier bags) million euros	674,5	732	+8,5%
Total revenues carrier bags million euros	258	305	+18,2%
Overall Employment	2315	2215	-4,3%
Employment for carrier bags	950	915	-3,6%
Companies with at least 50% of revenues from carrier bags segment	25	27	+8%

This means that, in a general contraction of sales, the law has helped to maintain employment and to increase the profitability; further than fostering technological innovation

Shopper Ban

economic and environmental evaluation 2011 vs 2010

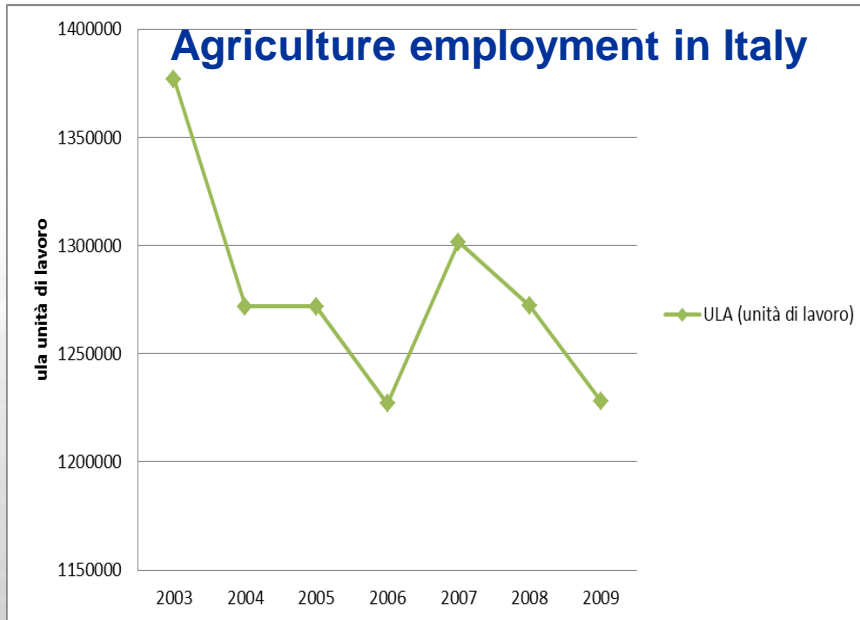
Consumption reduction :	25%	
Waste reduction:	20.7%	30.000 tons
Environmental impact:	- 39% oil consumption - 29% CO ₂ emissions	
Economic impact:	annual saving 5,1 ml€ - 26,4%	



This value is mainly represented by the landfill waste reduction.
Furthermore the CO₂ reduction has been quantified according to an average value of European Union Allowances.

Bioplastic

Agricultural impact



2020 Forecast: only for Italian bioplastic production it is supposed an employment increase of 400% in 2020 in Italy

	2012 production	2020 production
Employment for Italian Bioplastic production	79-119	400-603

Bioplastic value added of being compostable allow the development of the compost market, that, according to european approach to bioeconomy, close the natural cycle.

Bioplastic

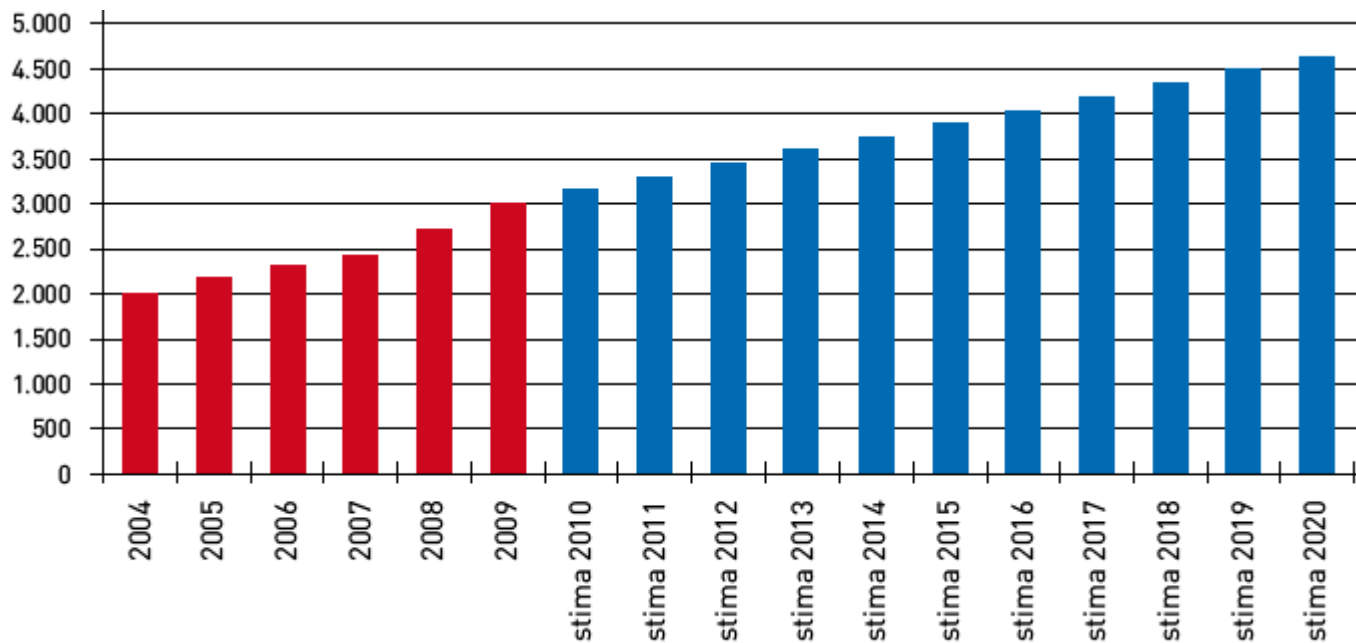
Waste management impact

- The introduction of compostable plastic bags for the separated collection of organic waste is the only way to allow municipalities to reach the separated collection targets established by EU
- The extra cost that the composting plants should face due to the presence of traditional plastic bags has been estimated in 26 MI €
- **In terms of new employment:**
 - Multiply times of collecting waste (the organic waste needs a more frequent collection service) generates a theoretical multiply index of 2,3
 - Composting Plants: in 2011 in Italy the workers in composting plants were 2779. The collection of separated organic waste is not yet done in every municipality; This means that it's possible to estimate a 30% increase of employees in this sector.

Bioplastic

Waste management impact

Organic waste collection trend (2004 – 2020)



Environmental and economical implications of most common bioplastic applications

The analysis extension to other bioplastic application (mulching films, organic waste bags, catering, fruit and vegetables bags in large scale distribution) has allowed to estimate the total benefit in terms of oil reduction (57%) , CO2 emissions (47%) and economic savings (around 82 ml€ / -80%).

These figures are very good, even if we have to be careful, because the research consider only niche applications; in many others bioplastics are not yet competitive



Bioplastics and employment

	Today	2020	Δ
Employment in agriculture originated from bioplastics production			
Employment in agriculture originated from bioplastics production	99	603	504
Employment originated from separate collection and treatment of biowaste			
Direct employment from biowaste treatment plants (composting and anaerobic digestion)	2779	Forecast at 2020: 30% increase In collection of organic waste	?
Employment linked to the Matrica Project in Porto Torres			
Direct jobs chemical plant	0	685	685
Indirect jobs chemical plant	0	68,5	68,5
Direct jobs in agriculture	0	1244	1244
Indirect jobs in agriculture	0	124	124
Employment linked to the reconversion project in Adria			
Direct jobs chemical plant	11	80	69
Indirect jobs	1,1	8	6,9
Employees in the Novara and Terni hubs			
Direct jobs	250	380	130
Indirect jobs	25	38	13
Converters /film blowers			
Direct jobs	480	700	220
TOTAL			3065

Conclusion

Italian case study represents an example of effective environmental regulation, with positive environmental and economic impacts; Italy has been a pioneer in this field with a law able to affect production and consumption process

This is a step, small but very important on the way to bioeconomy

