BIOREFINERIES FOR ADDED VALUE PRODUCTS AS OPPORTUNITY FOR LOCAL COMPETITIVENESS: THE MATRICA PROJECT

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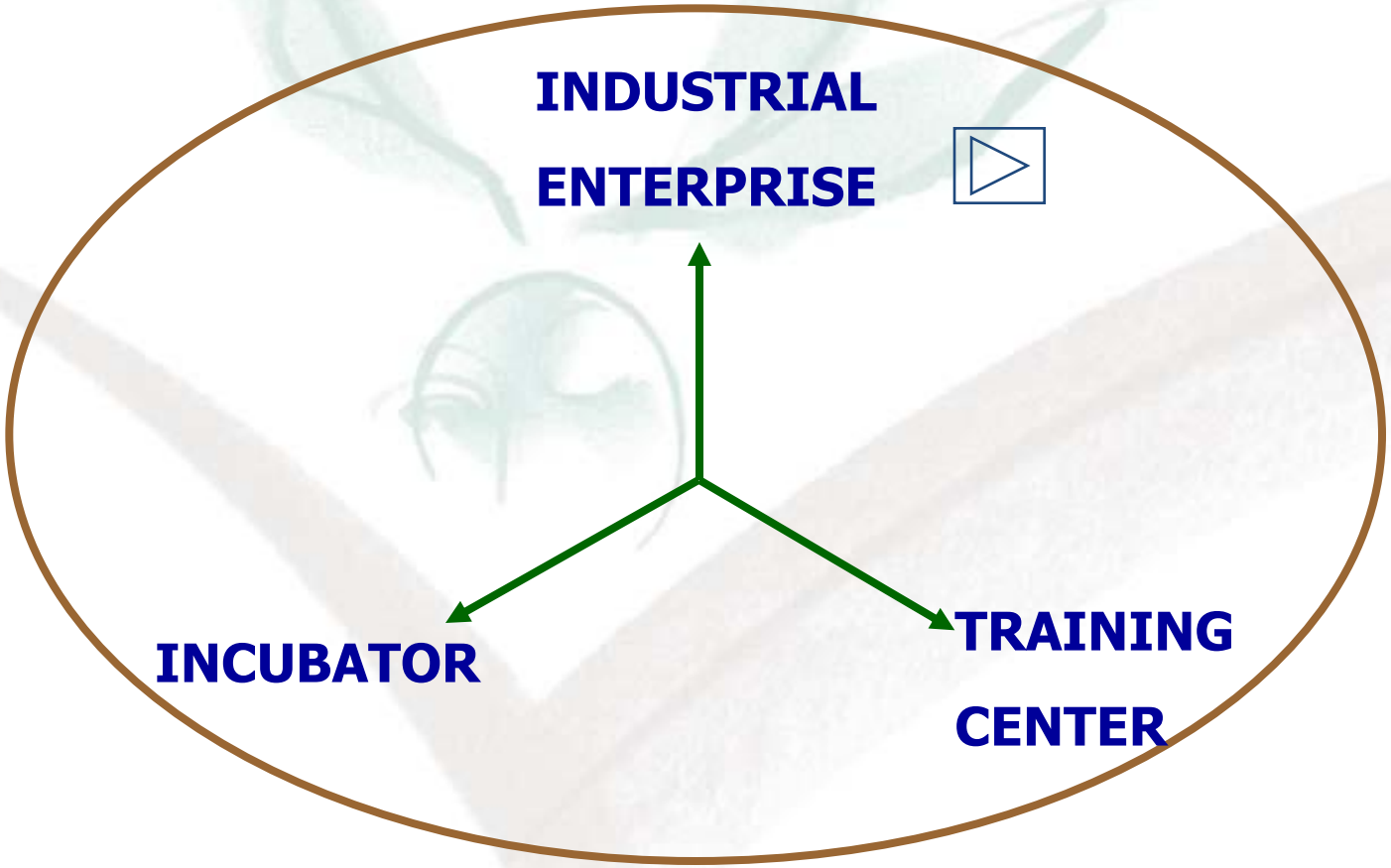
Novamont S.p.A

Conference Partnering for the Bioeconomy in European Regions

European Union – Committee of the Regions

Bruxelles, October 12, 2012

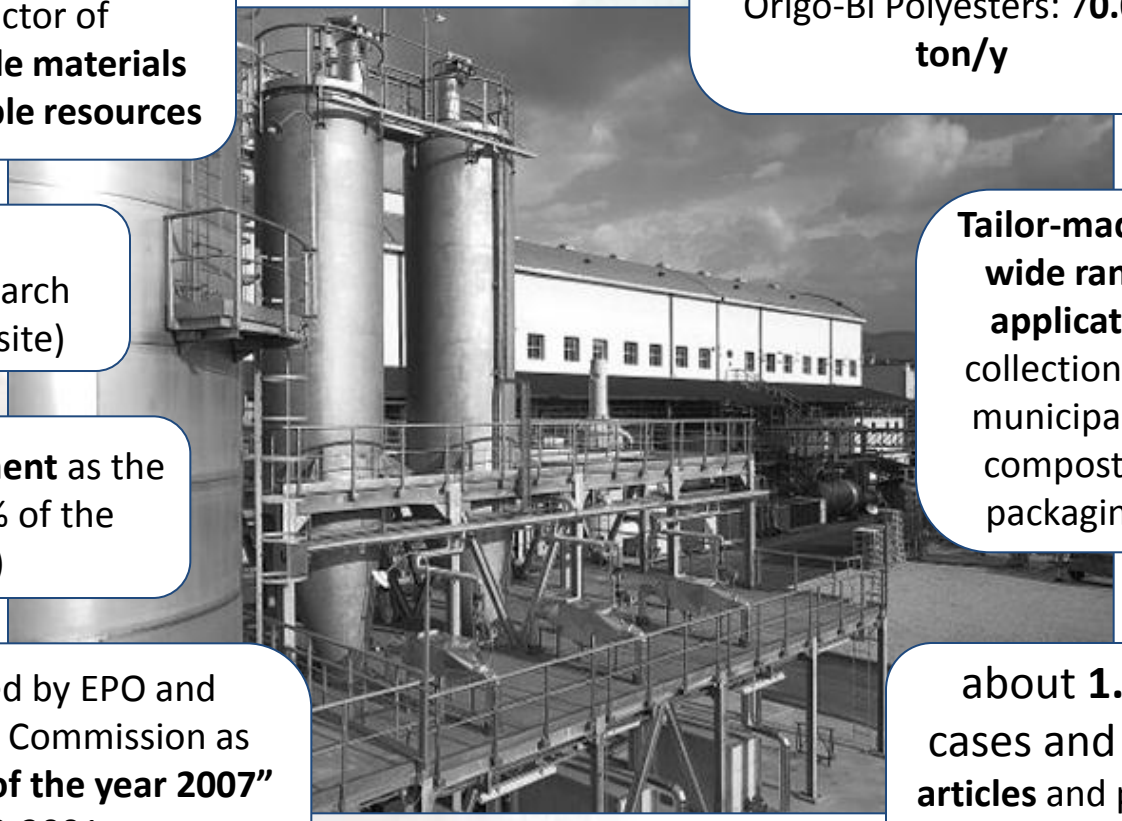
Novamont Today



Novamont's industrial profile (Turnover 2011: 160Ml€)

Productive capacity:
Starch Technology: 12**0.000 ton/y**
Origo-Bi Polyesters: 7**0.000 ton/y**

Pioneer and market leader in the sector of **biodegradable materials from renewable resources**



250 employees (Headquarters + research center + production site)

Tailor-made materials for a wide range of industrial applications: separated collection of the organic of municipal solid waste and composting, agriculture, packaging, catering, etc.

Research&Development as the driving force (25% of the employees)

Awarded by EPO and European Commission as **"Inventor of the year 2007"** for the 1992-2001 patents on bioplastics and the industrial achievements

about **1.000 patent** cases and more than **120 articles** and presentationd at international conferences,

Novamont Technologies and Development Scheme

RESEARCH&DEVELOPMENT

NEW LOW IMPACT MARKETS

Development

Expansion of capacity

Girasole (Helianthus Anuu)

Cardo (Carduus)

Cavolo d'Abissinia (Brassica carinata)

New plant build-up

SPECIALIZED SEEDS 2008

DEDICATED CROPS 2004

SEEDS CRUSHING

MONOMER 1 PROCESS 2004

POLYESTERS PROCESS 1997

COMPLEXED STARCH PROCESS 1989

Biomass treatments

Power Station

Biotechnological platform for Chemicals: Monomer 2

MATER-BIOTECH (Bio-BDO) (80/20 JV with Genomatica)

- Monomer 1
- Biolubricants
- Additives for rubber
- Other chemical intermediates

Matrica 2011

Biolubricants 2011

Sincro 50/50 JV with Coldiretti Farmers

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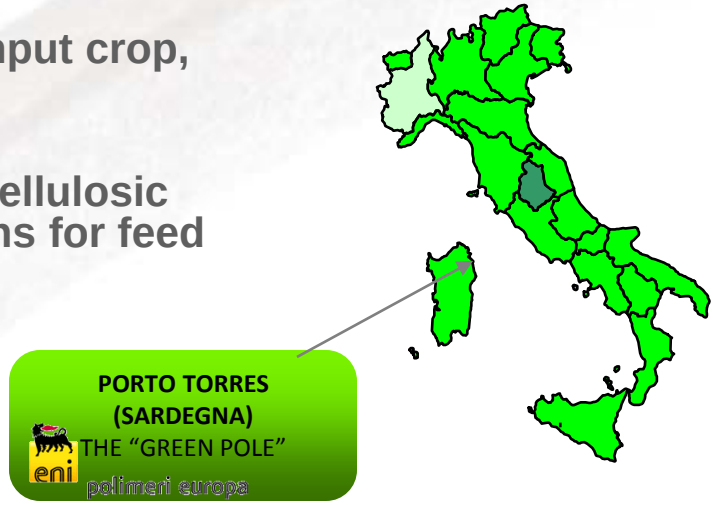
Living Chemistry for Quality of Life.

The Matrica Case

(PORTO TORRES/SARDINIA)

50/50 J-V between eni Versalis and Novamont for the transformation of the Porto Torres chemical site of eni in a third generation biorefinery for bioplastics, biolubricants and biofillers/additives for low rolling resistance rubber

- **The Biorefinery will directly employ about 680 people with significant indirect local effects,**
- **Integrated agricultural chain: pluriennial, low input crop, non irrigated land**
- **Use of non food oil and progressively of lignocellulosic residues to feed the different plants and proteins for feed**



The Green Project: Converting A Petrochemical Site Into A Biorefinery

Stage A

1. **BIO I MONOMERS PLANT** (32 kt/y)
2. **BIO I LUBRICANTS PLANT** (25 kt/y)

INVESTMENT: ***about €100 mln***
Start up: ***2014***

Stage B

3. **BIO-ADDITIVES PLANT FOR RUBBERS / EXTENDER OILS** (30 kt/y)
4. **BIO-FILLERS PLANT** (15 kt/y)

INVESTMENT: ***about €50 mln***
Start up: ***2015***

and

Novamont

Stage C

5. **BIO II MONOMERS PLANT** (100 kt/y)
6. **BIO II LUBRICANTS PLANT** (30 kt/y)
7. **BIOPLASTICS PRODUCTION PLANT** (120 kt/y)

INVESTMENT: ***about €300 mln***
Start up: ***2016***

Research Centre

- *R&D Project for BIO MONOMERS*
- *R&D Project for BIO LUBRICANTS*
- *R&D Project for BIO ELASTOMERS*
- *Research into new "green" products*

The project will focus on building 7 green chemistry plants and 1 technical center by Matrica, for a total capex of 450Ml €, to be carried out in 3 stages

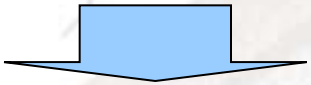
Further Private money: 500 Ml Euro for environmental recovery of the area by Syndial and 230 Ml Euro for a biomass power plant by Enipower

Integrated Third Generation Biorefineries For Biobased Products

- The Advantages-

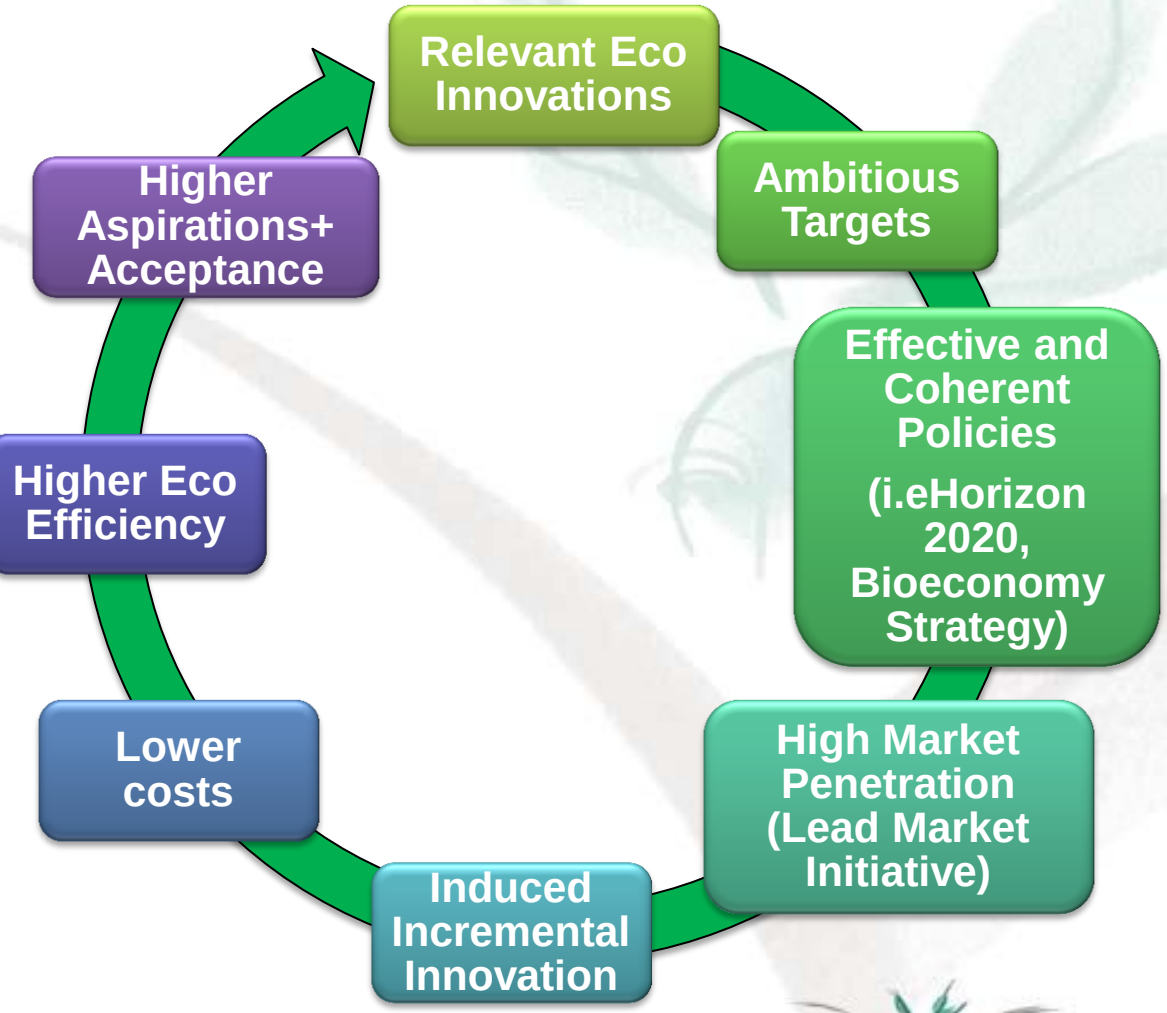
- ADDED VALUE PRODUCTS TAKING ADVANTAGE FROM THE LOCAL BIODIVERSITIES
- NON COMPETITION WITH FOOD

  (world consumption of fuel 1,5Bl ton, world production of corn 700Ml ton)
- INTEGRATION OF DIFFERENT TECHNOLOGIES
- CONVERSION OF DE-INDUSTRIALIZED SITES



FROM A PRODUCT-BASED ECONOMY TO A SYSTEM-BASED ECONOMY

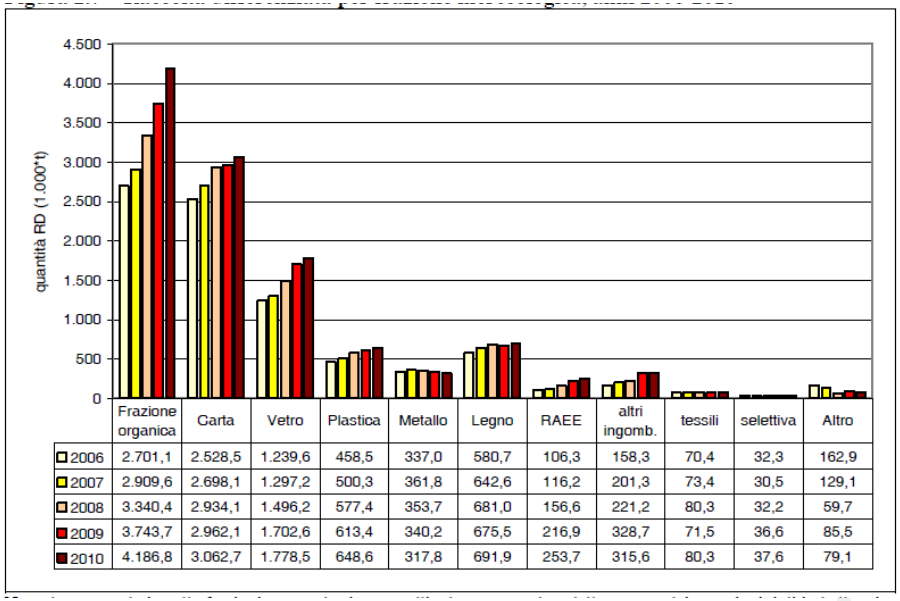
THE INNOVATION CYCLE FOR BIOBASED PRODUCTS: SYSTEMIC APPROACH AND COHERENT POLICIES TO UNLEASH GROWTH



ITALIAN POLICY ON BIOWASTE/ BIOPLASTICS

1. DL152/2006: 65% separate collection in 2012. Compost just from separate collection of organic waste. Organic waste to be collected either in biodegradable & compostable bags (EN13432) and paper bags or in bins
2. Financial law 2007: Shopping bags since January 2011 have to be either biodegrable and compostable or reusable
3. New law 28, 24/3/2012 : non reusable shopping bags have to be certified biodegradable & compostable according to the norm EN13432 by accredited bodies. Threshold thickness for reusable bags

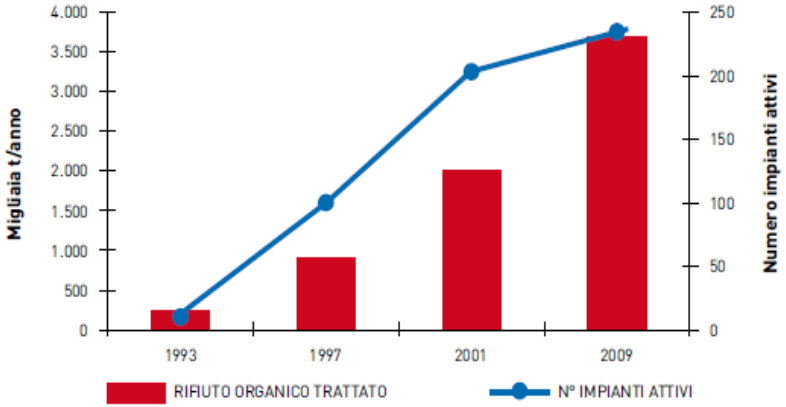
In Italy organic waste separate collection growth continues



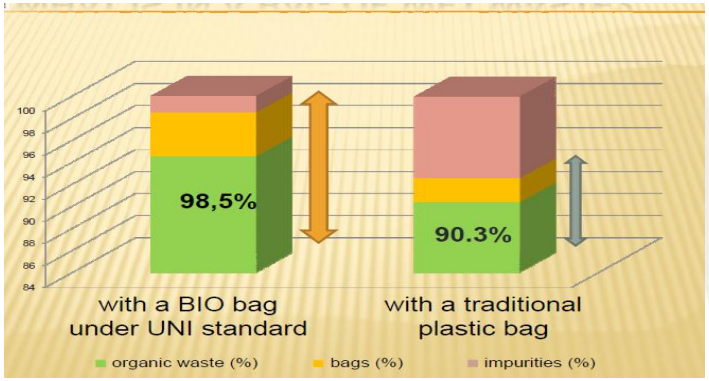
	Frazione organica	Carta	Vetro	Plastica	Metallo	Legno	RAEE	altri ingomb.	tessili	selettiva	Altro
2006	2.701,1	2.528,5	1.239,6	458,5	337,0	580,7	106,3	158,3	70,4	32,3	162,9
2007	2.909,6	2.698,1	1.297,2	500,3	361,8	642,6	116,2	201,3	73,4	30,5	129,1
2008	3.340,4	2.934,1	1.496,2	577,4	353,7	681,0	156,6	221,2	80,3	32,2	59,7
2009	3.743,7	2.962,1	1.702,6	613,4	340,2	675,5	216,9	328,7	71,5	36,6	85,5
2010	4.186,8	3.062,7	1.778,5	648,6	317,8	691,9	253,7	315,6	80,3	37,6	79,1

Volumes of separate collection of municipal solid wastes (data by ISPRA)

The Organic Waste Treatment Plants Capacity



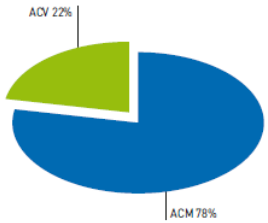
CIC DATA ELABORATED BY ISPRA FOR THE ANNUAL REPORT 2011 ON WASTE 2006-2010



Major polluttants >200000 ton plastics:

- **Shopping bags**
- **Fruits&veg bags**
- **Other bags**
- **Other plastic producs**

Figura 6. Produzione di ammendante. Anno 2009 (elaborazione CIC)



Marchio compost di qualità CIC

COMPOST QUALITÀ C.I.C.

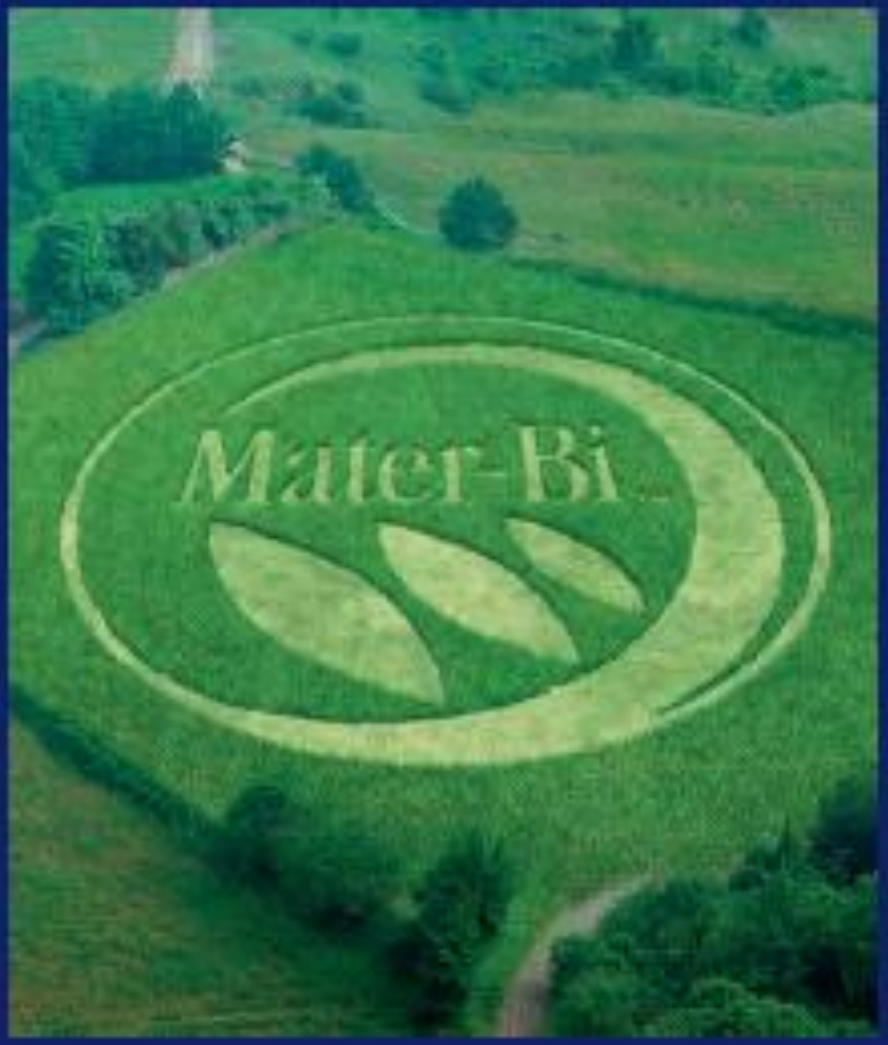
Matrica Project ‘s Targets

- Transform a deindustrialized chemical site in an efficient, clean, third generation integrated biorefinery: fast industrial integration with faster and faster return on R&D investments
- Contribute to the definition of system’s standards through practical demonstrative tests
- Partnerships at local and international level: a driving force to push new models of integration and cooperation between agriculture and industry
- Training of people with systemic vision and high tech knowledge

A continuous implementation of technologies, skills and partnerships in the effort to transform a dissipative model of economy in a conservative and competitive one restarting from the local areas

"THE CHALLANGE OF OUR MILLENNIUM IS IN THE BALANCE BETWEEN THE TECHNICAL MEANS THAT HUMANITY POSSESSES AND THE WISDOM IN HOW WE WILL MAKE USE OF THEM"

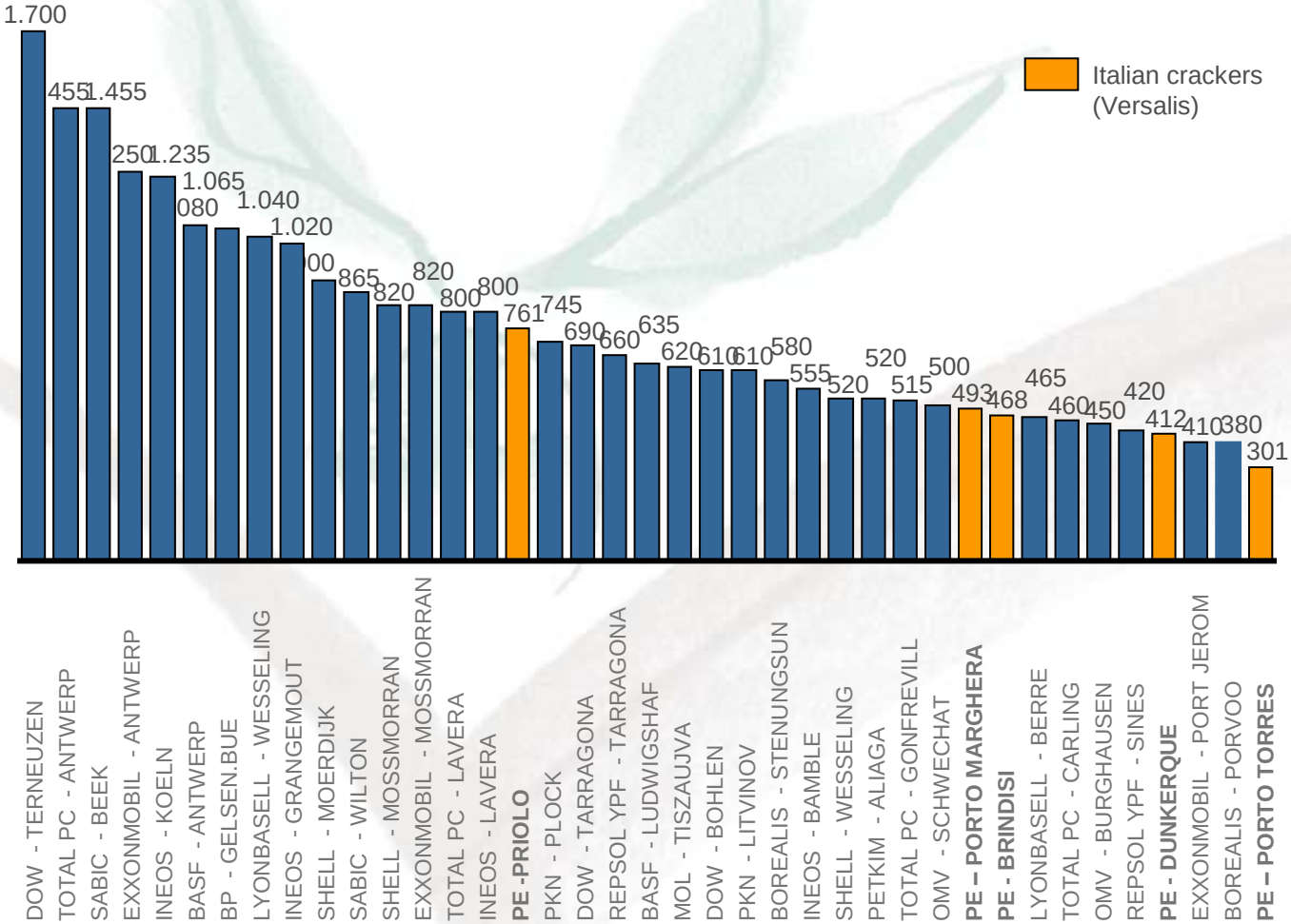
A real sign of sustainable development.



CRACKERS IN EU

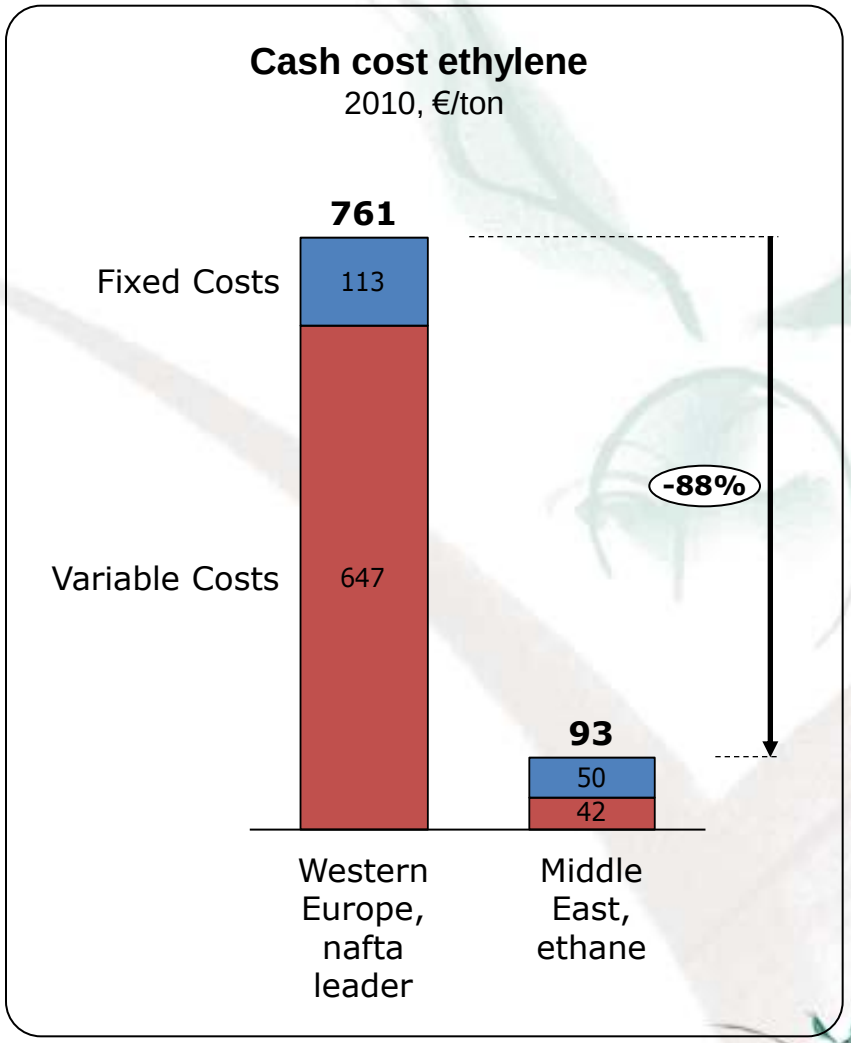
Declared capacity of main EU crackers (>300 Kton)

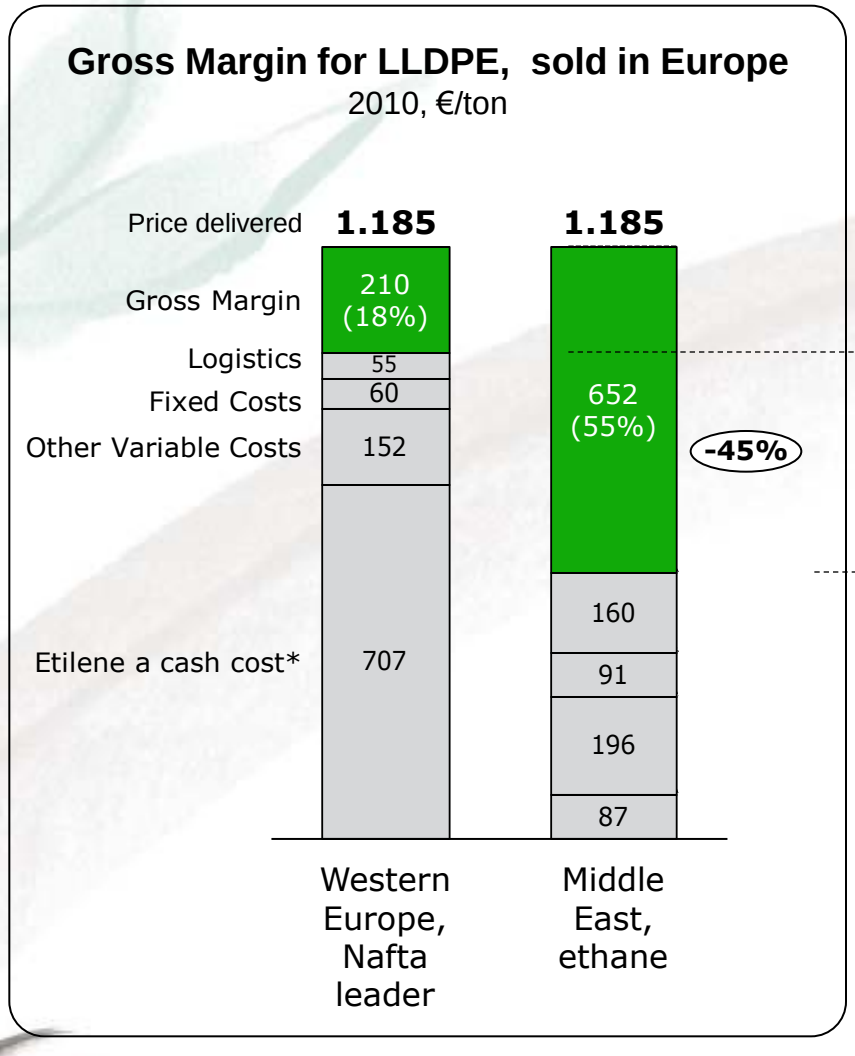
K ton



Fonte: Chem Systems

The Ethylene-Propylene Chain: Ethane-Based Productions in Middle East have a huge competitive advantage vs. Nafta-based Eu Productions





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Note: * per produrre una tonnellata di LLDPE occorrono 0.93 tonnellate di etilene

INDUSTRIAL AND EXPERIMENTAL SITES

NOVARA

ADRIA (RO) Fermentation Plant as industrial pilot
1600 m3 fermentation capacity /Mater-Biotech

PORTO TORRES (SS
Third generation
Integrated biorefinery

TERNI (Origo-Bi + Mater-Bi production)
R&D vegetable oil crops / biolubricants from local crops

SAN MARCO
EVANGELISTA (CE)
(Biotechnological center)

PATRICA (FR)

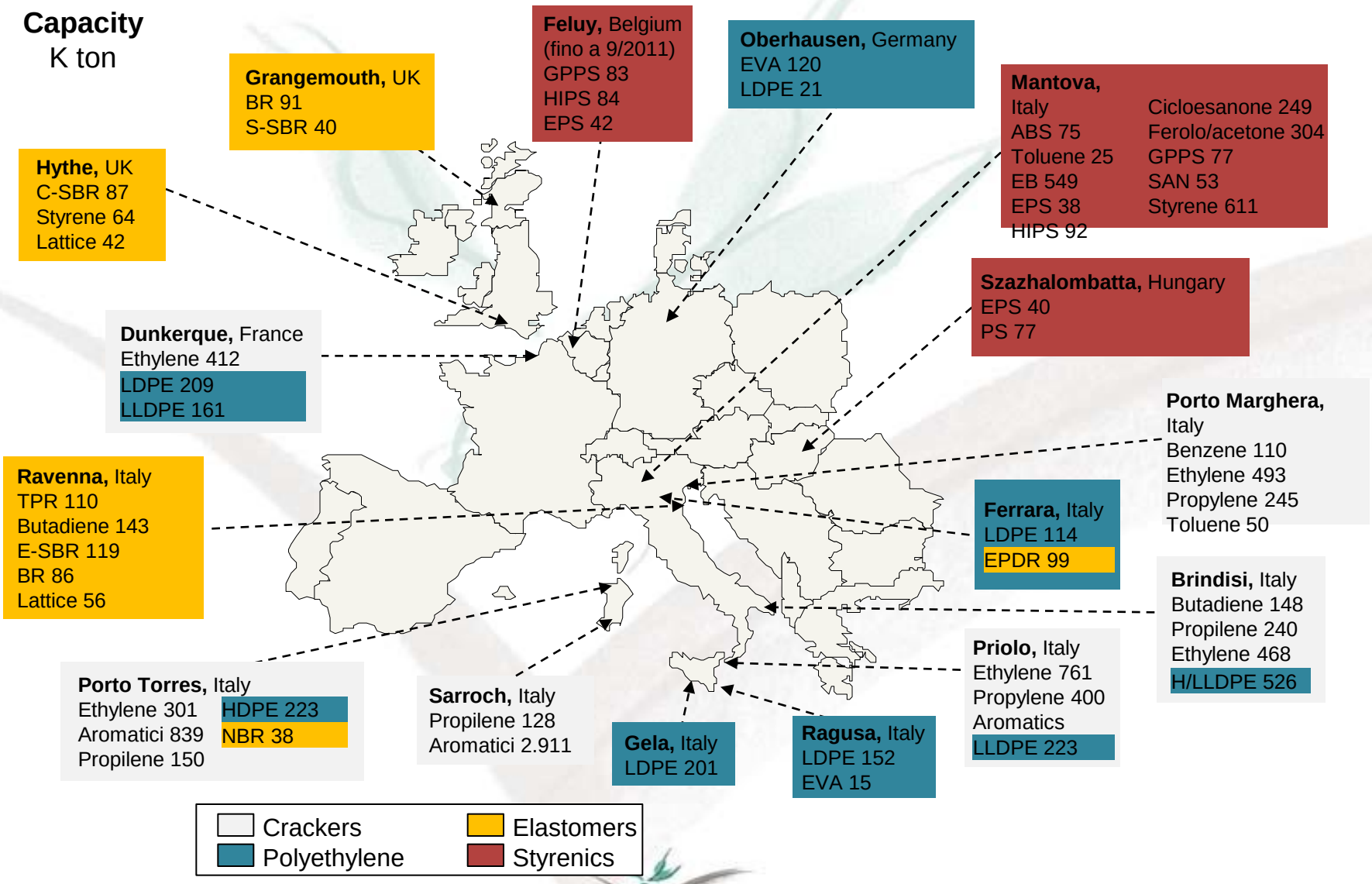
(Origo-Bi production)

HEADQUARTERS

PRODUCTIVE SITES

R&D CENTRES

VERSALIS HAS A EUROPEAN FOOTPRINT



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