

Pannonia and Beyond: 5 Years of Bioeconomy Investing in Eastern Europe



Global Bioenergy Partnership
Budapest
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Ethanol Europe

A proud member of



Who are we?

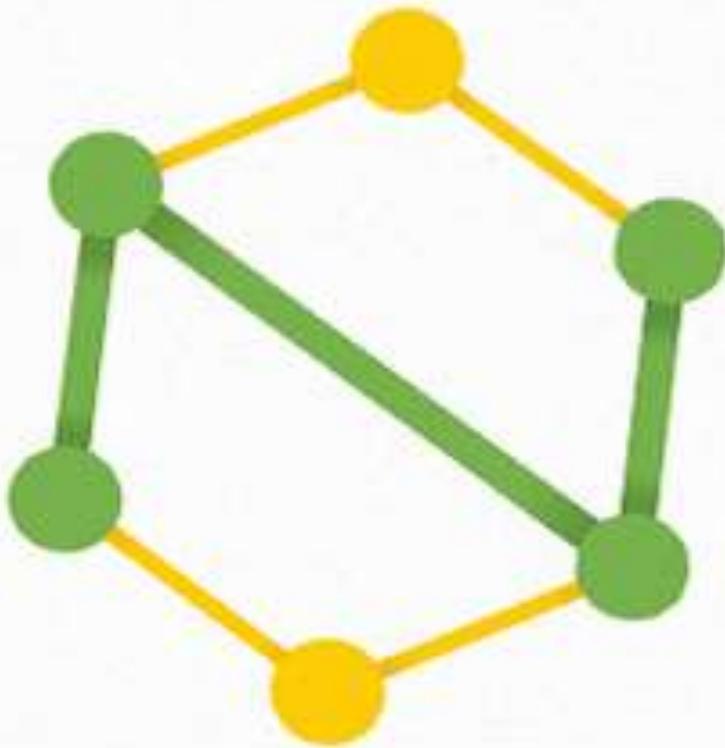
- Ethanol Europe Renewables Limited is a family and management owned company founded in 2010
- Pannonia is our flagship investment
- We are committed to all of the bioeconomy, not just to one technology
 - We invest in about 12 technologies at present, supporting bioeconomy entrepreneurs in manufacturing bioproducts
 - We have done all of this without receiving a single grant

Pannonia

COMMERCIAL
FACTS

Pannonia alone represents
€200MM in investments

Pannonia Ethanol is Europe's leading biorefinery



Nano Oil
by PannoniaEthanol

Ethanol Europe

A proud member of



FARM
EUROPE **ePURE**
european renewable ethanol

Pannonia Ethanol is the largest bioeconomy project in Europe to be completed under the World Bank's Social and Environmental Performance Standards



Potential and benefits of carbon abatement by ethanol use in Hungary

Prepared for Pannonia Ethanol Zrt.

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- supports more than 2000 jobs
- ethanol produced now has 67% GHG savings, up from 49% at inception, and likely to reach 90% savings by the end of the decade

Carbon Abatement Cost:
negative €2/ton

There are 20 biogas plants in Europe for every liquid biofuel plant

- Pannonia produces (and uses) 100,000 cbm of biogas every year, and always has, although we do not talk about it (or about our electricity production)
- Pannonia currently uses 1% of Hungary's natural gas
- Pannonia is considering building Europe's largest biogas plant to use the biogas feedstock that we planned to use for cellulosic ethanol
 - Biogas plants are cheap and scalable
 - Since Pannonia can use this biogas in its own production process in lieu of existing natural gas, the regulatory downside is limited. On the other hand the upside is there if regulations change to provide demand and a premium for transport uses

The Biggest Non-Issue in the Bioeconomy

- Pannonia was the only truly non-recourse greenfield biofuel project financing in the first half of this decade in the entire Northern Hemisphere
- EERL has arranged many other loans, including in recent years highly leveraged and structured loans from commercial banks. All with perfect debt service.
- EERL can't get banks to treat equity risk as debt risk, nor do we try
- It is easier to finance bioeconomy projects than other projects, much easier, at least in the European Union

How OECD, IMF, EU JRC, FAO, UNHCR, World Bank, IFPRI all got it wrong?

POST 2007 FORECASTS OF BIOFUEL IMPACTS ON FOOD AND COMMODITY PRICES BY WORLD AUTHORITIES



World Bank
...the most important factor in the
2008 price spike
...forced global food prices up by 75%



IFPRI
Real prices of maize and oilseed in
2020 will be 26% and 18% higher



IMF
...accounts for 70% of the increase
in corn prices



EU JRC/UNHCR
Higher prices by 2020 for vegetable
oils by 36% and maize by 22%

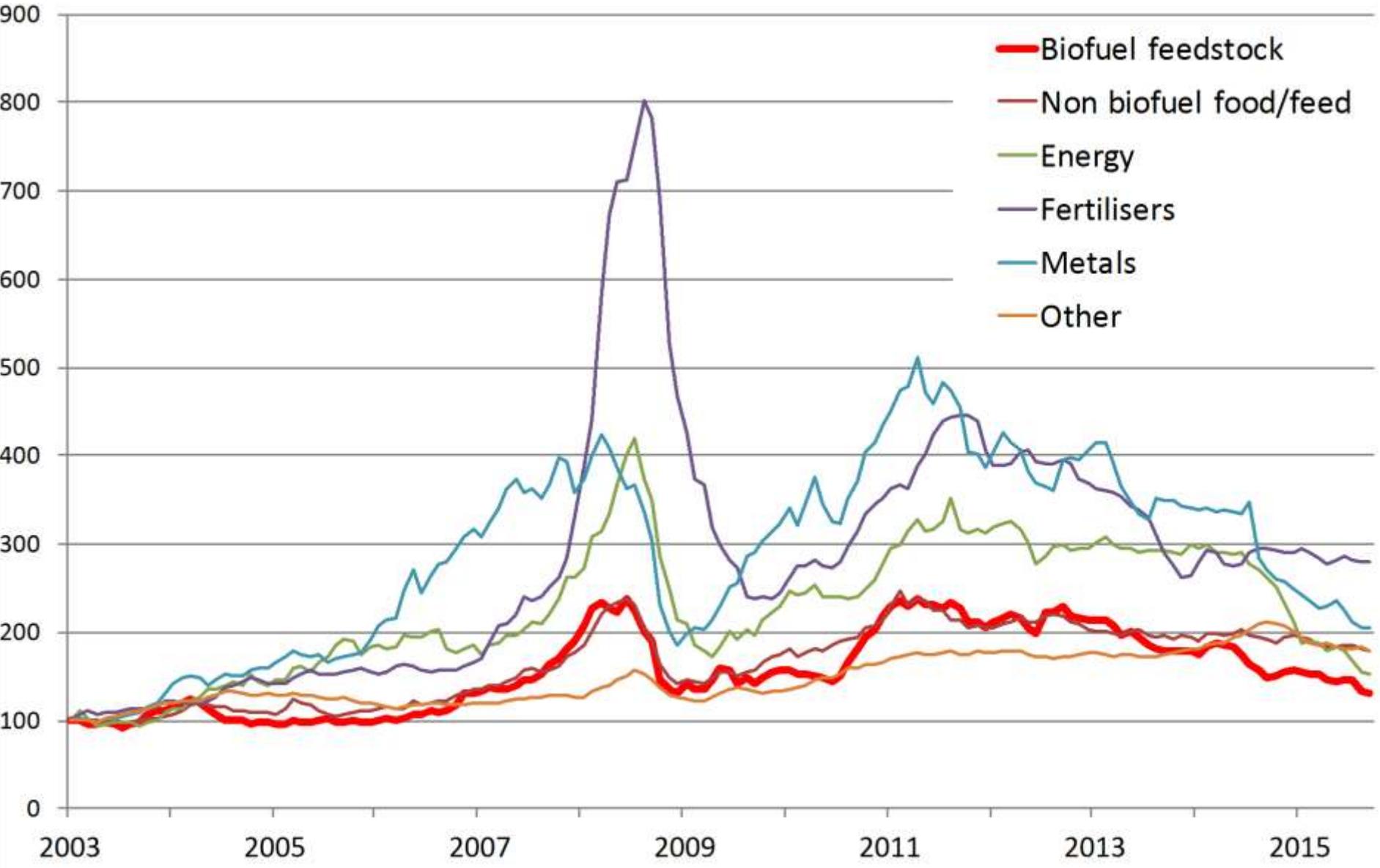


FAO
...likely to push commodity prices
up 12-15% by 2017



OECD
Prices for wheat, coarse grains, oilseeds
and vegetable oils could be increased by
8%, 13%, 7% and 35% respectively by 2017

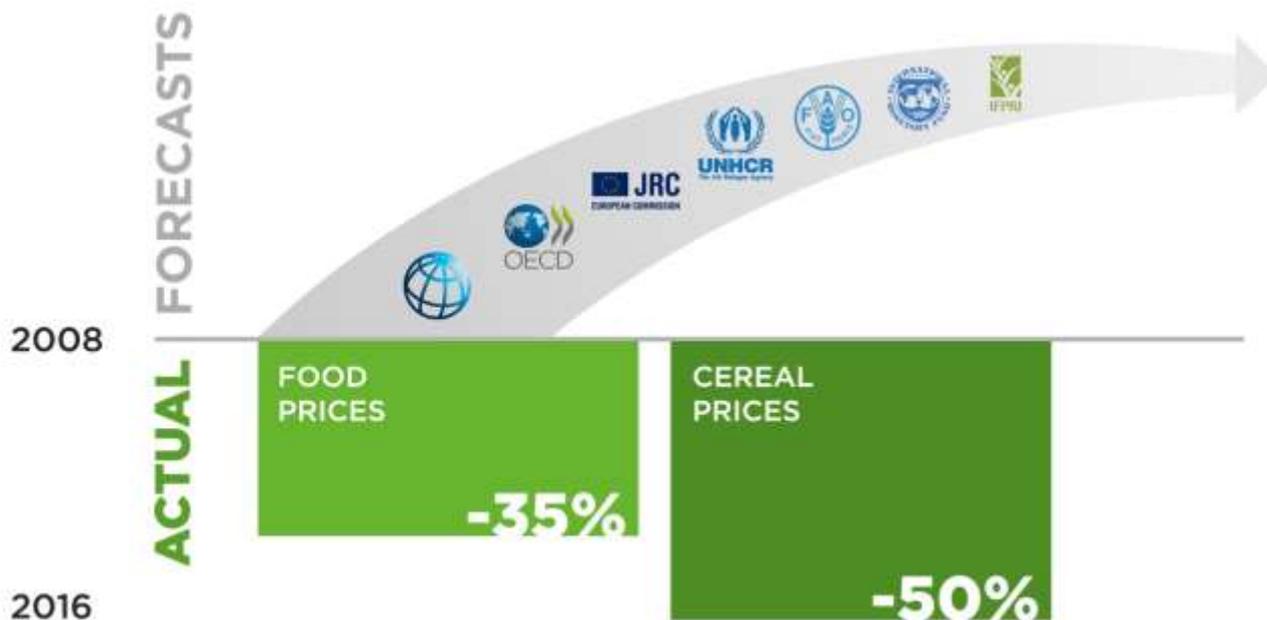
JRC, IFPRI, IMF, FAO, IMF, World Bank and OECD data were compiled on respectively different bases and it is not possible to illustrate these on a directly comparable basis. The grey bar does not represent precisely these bases and is purely illustrative that they forecast price increases whereas prices actually fell. These figures were widely used by NGO's and others as fact and were not contradicted by the institutions in question. The Source of the Actual Performance data in the green bars is FAO and F.O. Licht. http://www.fao.org/worldfood_situation/foodpricesindex/en/



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FOOD & COMMODITY PRICE TRENDS 2008 TO 2016 FORECASTS VERSUS ACTUAL PERFORMANCE

This chart shows (in green bars) the substantial decrease in Food and Commodity Prices between 2008 and 2016, the opposite of widely used and believed forecasts by internationally respected institutions, (illustrated by the grey curved arrow).

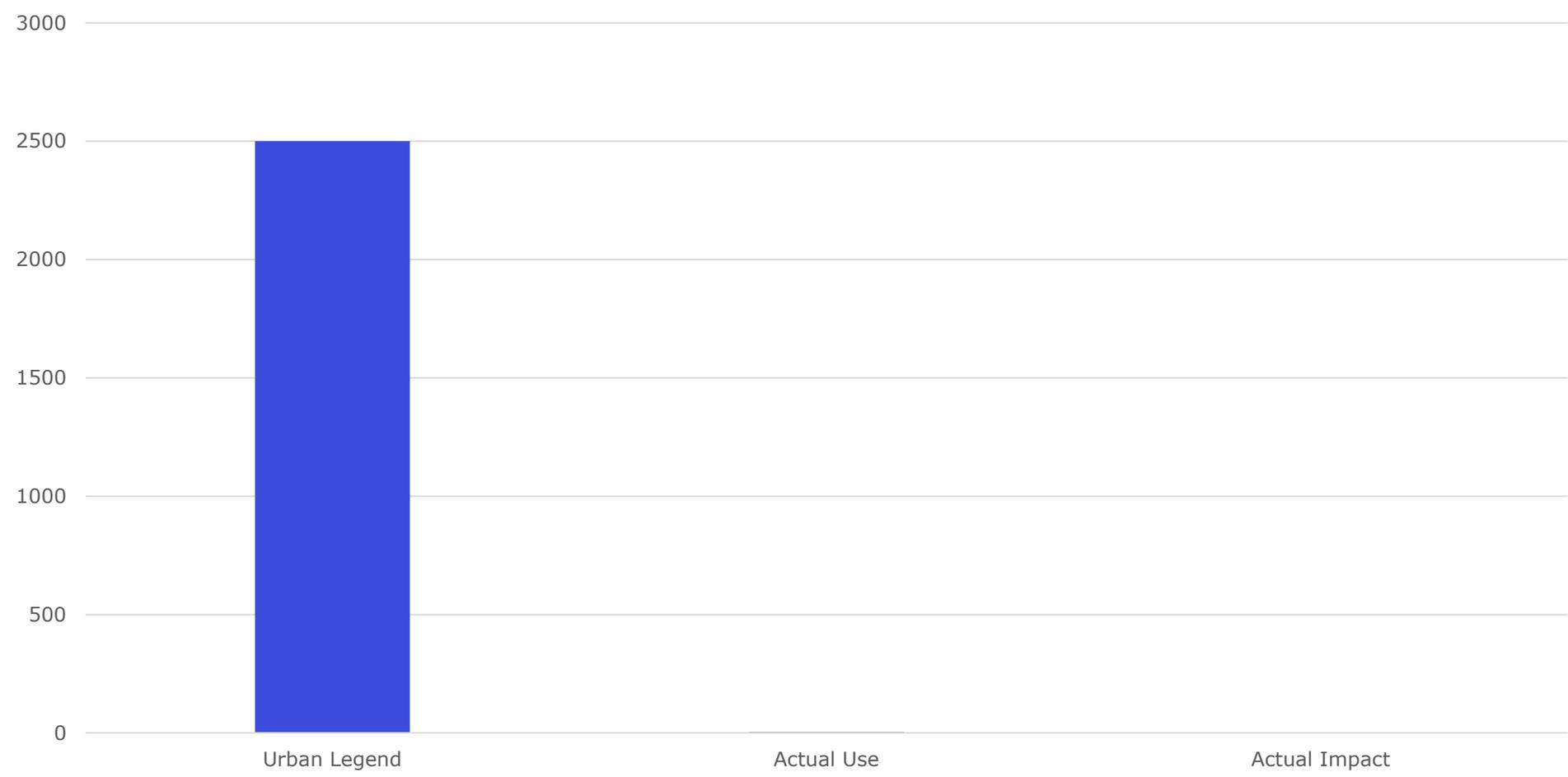


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Water



Ethanol Production Water Use per Liter



EERL's Pace of Investments is Increasing

- Our investments have been repeatedly frustrated by incredibly bad EU policies birthed in Brussels. These have led to the cancellation in 2012 of large investments in Hungary, Croatia and Serbia to replicate Pannonia, financial losses of over €10m for EERL and the loss of >5000 jobs overnight for these countries.
- Projects in our bioeconomy pipeline other than Nano Oil and a yet-to-be-unveiled plant already built at a cost of millions of Euros, include:
 - Through Pelagonia, pioneering an immense cellulosic ethanol project in Macedonia
 - bioplastics for a global FMCG player
 - prebiotics production (at scale to make us the largest producer in the world)
 - world's first economically sensible carbon capture and use technology

Sustainable Biomass Context

GBEP
CONCERNS

EERL is at the center of Eastern Europe's largest supply chain

- Pannonia is (to be slightly unfair to Germany's Verbio) probably the only buyer of >1,000,000,000 kilos per annum of sustainable biomass in Eastern Europe
- we created and maintain this system; when we launched our investment it simply did not exist
- farmers receive approximately €100,000,000 per year directly paid from Pannonia to their bank accounts for their sustainable biomass (and sustainable traders receive the rest)
- Pannonia now holds an annual investment event for 1000 farmers called Agro Innovation Day to facilitate sustainable intensification, and Pannonia talks to farmers every day (and for 10 of our employees, that's essentially their job description)
- for the past four years, Pannonia and Pelagonia have been growing energy crops in Hungary and Macedonia (again paying farmers directly)

EERL is at the center of Eastern Europe's largest supply chain

- The potential for sustainable intensification of biomass in Europe is breathtaking. Worries about lack of biomass are largely founded in a Western European urban mindset that fails to comprehend the reality of rural decline
- FAO understands this issue and is the sole and unique exception among European policy makers
- Energy crops are in general more sustainable, more investment and climate friendly than residues (which the science now recognizes), but Western European think tanks and universities have developed a cult of residues. Ethanol Europe will not invest in a residue-based project because we do not understand how it could be sustainable or bankable

Investment is Dead

- The 2009 Renewable Energy Directive was and is a massive failure. The EU killed biofuels in Europe as an investment class prior to 2010; Pannonia is the sole large (>100 million liter) project created by that directive
- The only people interested in liquid biofuel investments today are folks who want to sell technology or who (like EERL in 2010) don't understand the actual regulatory risks
- The investment consequences of these policies can be seen from EERL's experience. The result of our ambition to invest in three advanced biofuel technologies and a low-ILUC biodiesel product are:
 - Pelagonia is suspended
 - a cellulosic investment was stopped 1/3 through actual implementation, so that Pannonia today produces (tiny amounts of) cellulosic ethanol but doesn't bother to sell it as such
 - the one continuing project has been diverted to biomaterials that can be exported out of the EU
 - the biodiesel product goes to animal feed instead

**Thank you for your
attention**

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