



Croatia country-wide feasibility study and lessons learned

J. Domac, B. Kulisic

Cavtat, 12-13 November 2007



Introduction

- **MZOPUG** – Department for atmosphere protection
- **UNIDO** – project leader:
Fatin Ali Mohamed, Ph.D.
- **National coordinator:**
Julije Domac, Ph.D.
- **National experts:**
Faculty of agriculture
Faculty of Food Technology
and Biotechnology
- Budget: 80.000 US\$
- Timeframe: 04/2004 –
05/2006



PROMOTION OF BIODIESEL PRODUCTION
XP/CRO/03/022
CROATIA

**BIODIESEL PRODUCTION PROMOTION
COUNTRYWIDE FEASIBILITY STUDY
FOR A POTENTIAL CROATIAN
BIODIESEL INDUSTRY**

Final Technical Report
Prepared for the Government of Croatia
By the United Nations Industrial Development Organization

Project manager: Dr Fatim Ali Mohamed

National project coordinator: Dr Julije Domac

Contributing authors and institutions:



Energy Institute *Hervoje Pozar*
Velimir Segon, M.Sc.
Dr Julije Domac
Biljana Kulisic, M.Sc.

*BICRO d.o.o.



Business Innovation Center of Croatia
Faculty of Food Technology and Biotechnology University of Zagreb
Prof dr Branko Tripalo
Marenka Radoš
Vlatka Mrkić, M.Sc.
Dr Marijan Andrašec
Marko Ukrainczyk
Mladen Brnčić, M.Sc.



Faculty of Agriculture University of Zagreb
Prof dr Tajana Krička
Neven Voća, M. Sc.
Prof dr Frane Tomić
Dr Željko Jukić
Dr Darko Kiš



UNIDO ITPO Italy
Dr Marco Nardini



Austrian Biofuels Institute
Dr Werner Koerbitz

Vienna, May 2006

A little bit of history...

- 1992 – Faculty of Agriculture
- 1997 – BIOEN Energy Programme
- 2000 – ‘BIODIZEL’ Project
- 2003 – EU Biofuels Directive
- 2004-2006 – UNIDO Project
- 2005 – Accession negotiations Croatia/EU
- 2005 – Ordinance on Biofuels Quality
- V / 2006 – Modibit Ltd., biodiesel (rapeseed) 20000 t
- XII / 2006 – Vitrex Ltd., biodiesel (rco) 6000 t
- XII / 2006 – Biofuels Market Plan



Lessons learned 1992-2006

- We all agree about the benefits, but...
- Who needs to do a first step – Government, experts, entrepreneurs OR farmers?
- Who needs to do what – Government, experts entrepreneurs AND farmers!
- No progress without:
 - Clear political will
 - Motivated entrepreneurs (industry)
 - Information (real experts)



Drivers: Biofuels objectives/ national strategy (1)

- *EU acquis communautaire*
 - *Directive 2003/30/EC on the promotion of the use of biofuels or other renewable fuels for transport (sets referent values for national indicative targets for 2005-2010)*
 - *Directive 2003/96/EC restructuring the Community framework for the taxation of energy products and electricity (allows full or partial tax exemption)*

Drivers: Biofuels objectives/ national strategy (2)

- United Nations Framework Convention on Climate Change (UNFCCC) – Croatia member from 1996 as Annex I country
- Kyoto Protokol signed in March 1999
- Emission reduction of 5% for base year during 2008-2012
- Very low level of initial level in 1990, emissions per capita among the lowest in Europe (4.8 t CO₂ per capita)
- At 11th Conference of the Parties (Montreal, 2005), Croatia allowed certain flexibility in determining referent level of GHG emissions, with committed utilisation of renewable energy sources

Lessons learned 2004-2006: Institutional support

Support schemes

- incentives
- farmers education

Plan of placing biofuels on the domestic market in 2007

- 20000 tons (0,9% in 2007)
- Fuel suppliers (producers for domestic market, importers)

Ordinance on Biofuels Quality (2005)

- Limiting values and quality parameters
- Quality measuring definition
- Sets national indicative target of biofuels in total fuel consumption of 5,75% until end of 2010

Lessons learned 2004-2006: Insstitutional/Legal framework

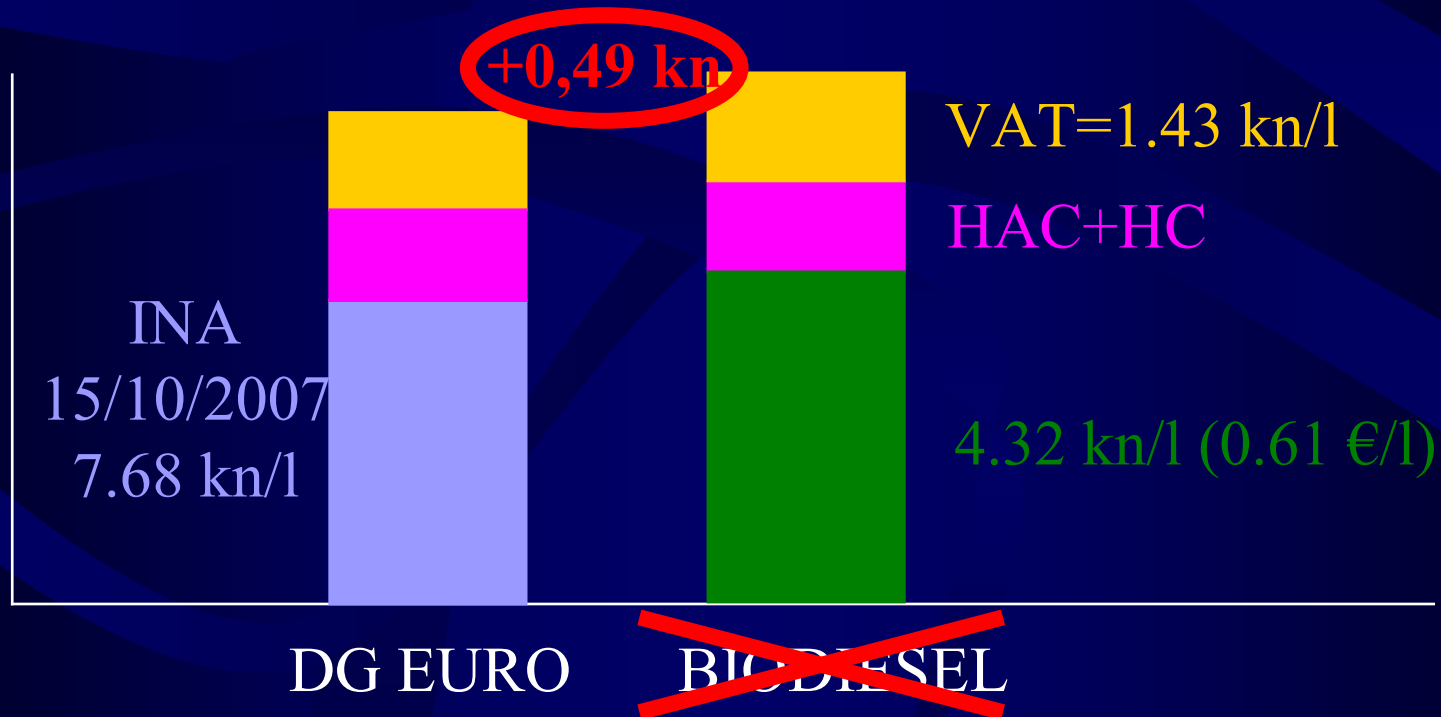
- Cooperation between Government departments / Ministries often missing!
- Different drivers should not mean different policy!
- Government policy need to be consistent! (e.g. agricultural subsidies)
- Government / Industry and Government / Farmers interrraction is crucial!
- Do not touch Govenment income (tax)!

Challenges: Agriculture

- Total agricultural area: 1,4 mil. ha
- Private farms *vs.* Legal entities in agriculture 83:17; Average farm size: 2,8 ha (!)
- Coverage of domestic needs of oilseeds and vegetable oils 52% (!)
- Average yield of rapeseed: 1,52-2,45 t/ha (!)
- Low overall efficiency of agricultural production
- Low level of farmers education and awareness

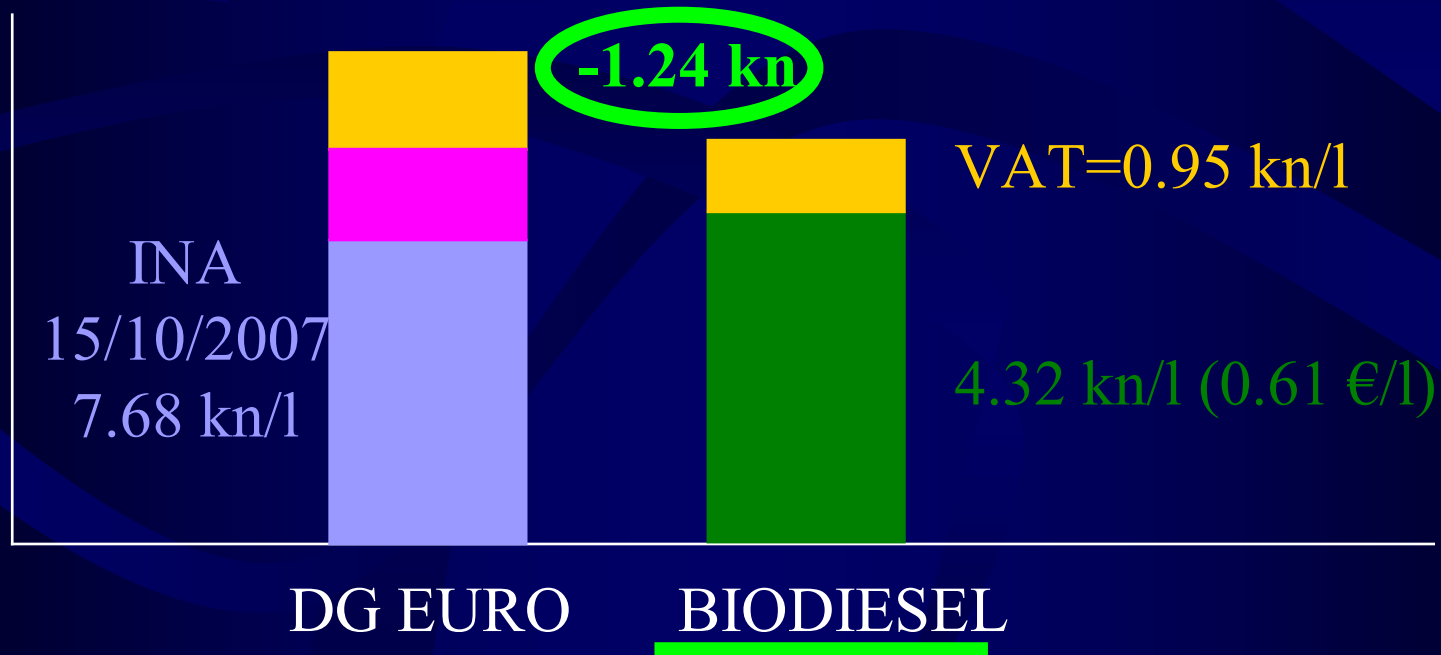
Challenges – fiscal policy (1)

- Tax (excise duty) exemption as key measure for biofuel competitiveness



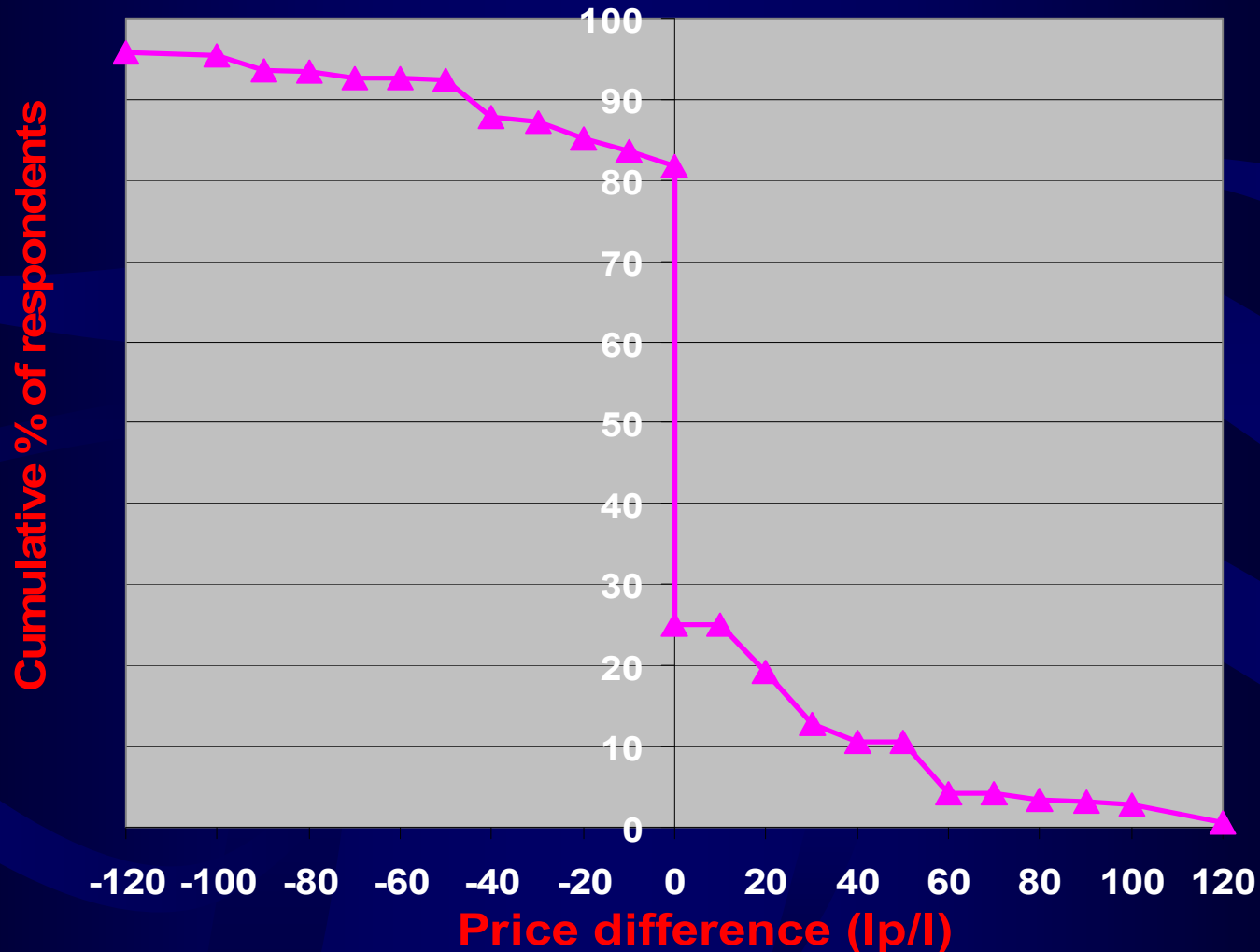
Challenges – fiscal policy (2)

- Tax (excise duty) exemption as key measure for biofuel competitiveness



Challenges: Public Acceptance

2003 Public Opinion Survey



Macroeconomic effects of biodiesel production

- Biodiesel production chain:
 - Rape cultivation: on idle fields and traditional production fields (food fields)
 - Oil production and transesterification
 - All associated transport and commercial services
- Services associated with rape cultivation
- By-products of oil production and transesterification (Glycerine, Rape meal)
- Displacement effects

Direct and indirect effects

- Macroeconomic analysis – direct and indirect effects on the overall economy:
 - Newly originated final demand for biodiesel creates multiplier effect through value added
 - Investments in production capacities and logistics – demand for capital goods
 - Economic output of biodiesel production effects directly and indirectly government revenue

Assumptions

- Modelled annual production 60.000 t/yr
(Biofuels Directive 2005 indicative target)
- Building and storage facilities already exist
- Biodiesel blended to mineral diesel (5/95%)
- Biodiesel free from excise duty and highway fee

Macroeconomic effects - quantification

- Changes in the following macroeconomic categories:
 - GDP
 - employment
 - government income
 - subsidies
 - imports
 - private consumption
 - income from employment
 - income from property and entrepreneurship

Indicators and Results

- Government tax revenue reduction (excise duty): 56.8 million HRK (7.57 million Euro)
- Croatian motorways fee revenue reduction: 22.72 million HRK (3.03 million Euro)
- Income from employment: 125-160 million HRK (16.67-21.33 million Euro), depending on price scenarios

Final recommendations

- Clearly identify and distinguish specific parts of biofuels production chain:
 - Agricultural production
 - Process industry and entrepreneurship
 - Production, processing and sale of oil derivatives
- Measures of state policy:
 - Create stable and clear legislative framework and regulation
 - Stimulate entrepreneurships in biofuels field
 - Enable scientific and technical support and cooperation

Thank you for your attention!

Contact:

Julije Domac, Ph.D.

Biljana Kulisic, M.Sc.

Energy Institute Hrvoje Pozar

Savska 163

10000 Zagreb, Croatia

E-mail: jdomac@eihp.hr

bkulisic@eihp.hr

