

*Expert Consultation
on
Sustainable Charcoal Production, Trade and Use in Europe*



Lessons Learned in Croatia
First Results of a FAO TCP Project

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ENERGY INSTITUTE
HRVOJE POŽAR

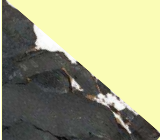
Project basics

- ☞ **Duration:** April 2006 – January 2008
- ☞ **Recipient:** Ministry of Agriculture, Forestry and Water Management
- ☞ **Lead Technical Officer:** Dr Miguel Trossero
- ☞ **National Project Coordinator:** Dr Julije Domac
- ☞ **International Consultants:**
 - Dr Nike Krajnc, Slovenian Forestry Institute
 - Dr Roland Siemons, Clean Fuels b.V.
 - Dr Yves Schenkel, Walloon Agricultural Research Center
- ☞ **Budget:** US\$ 285,000





Outputs

1. An analysis and assessment of the current situation of biomass supply sources for charcoal making in Croatia
 2. An evaluation of existing technologies used for charcoal production and identification of new solutions
 3. Technical, environmental and economic studies of new technological options
 4. GIS based analysis of biomass potentials, supply and demand in Croatia
 5. An action plan for the modernization of charcoal industry
 6. Capacity building / Education
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Project team

☞ WG Technology

ENERKON



☞ WG Market, Economy and Environment



bellóce

☞ WG Institutional and legal aspect



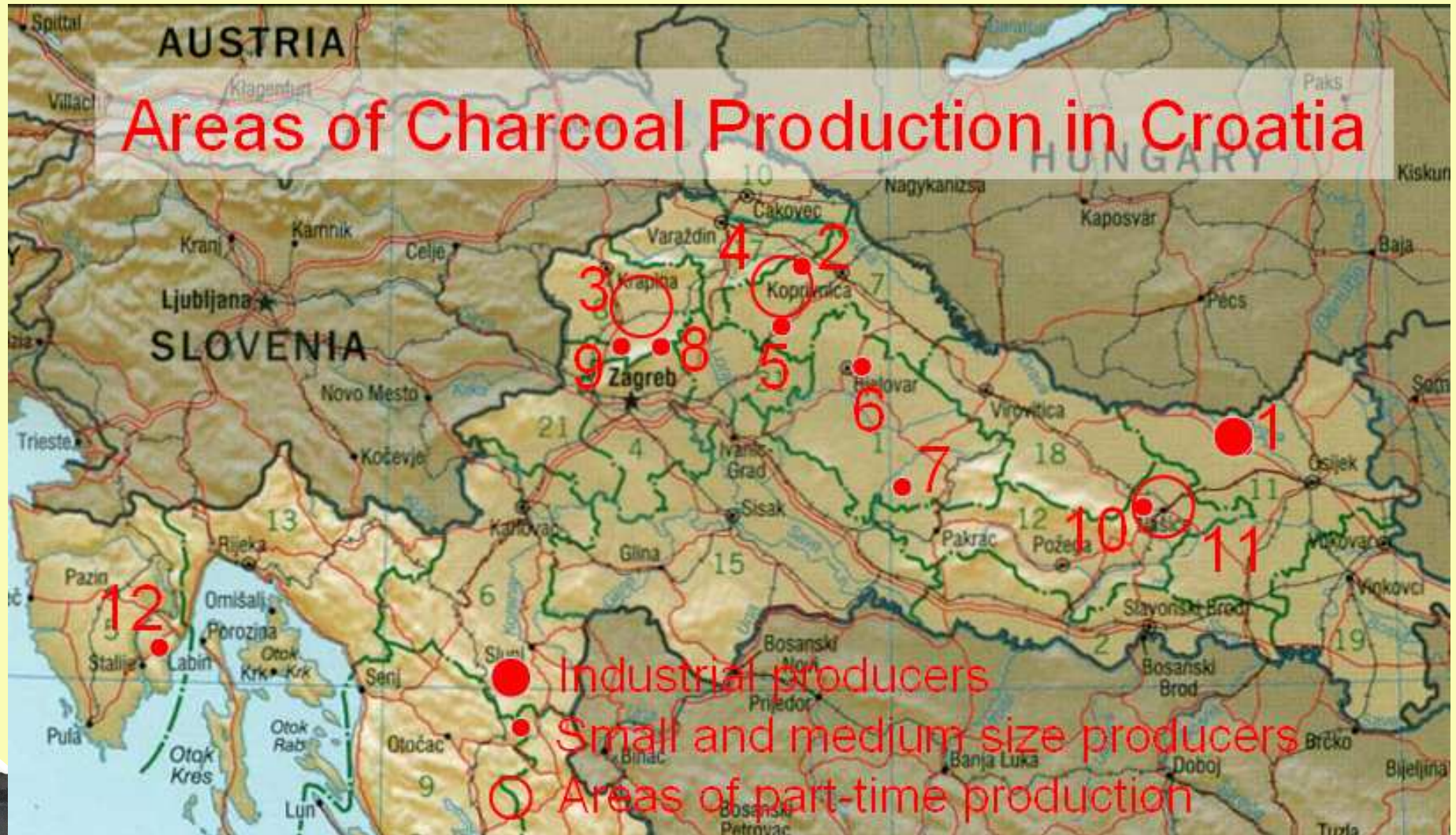
☞ WG GIS maps and databases



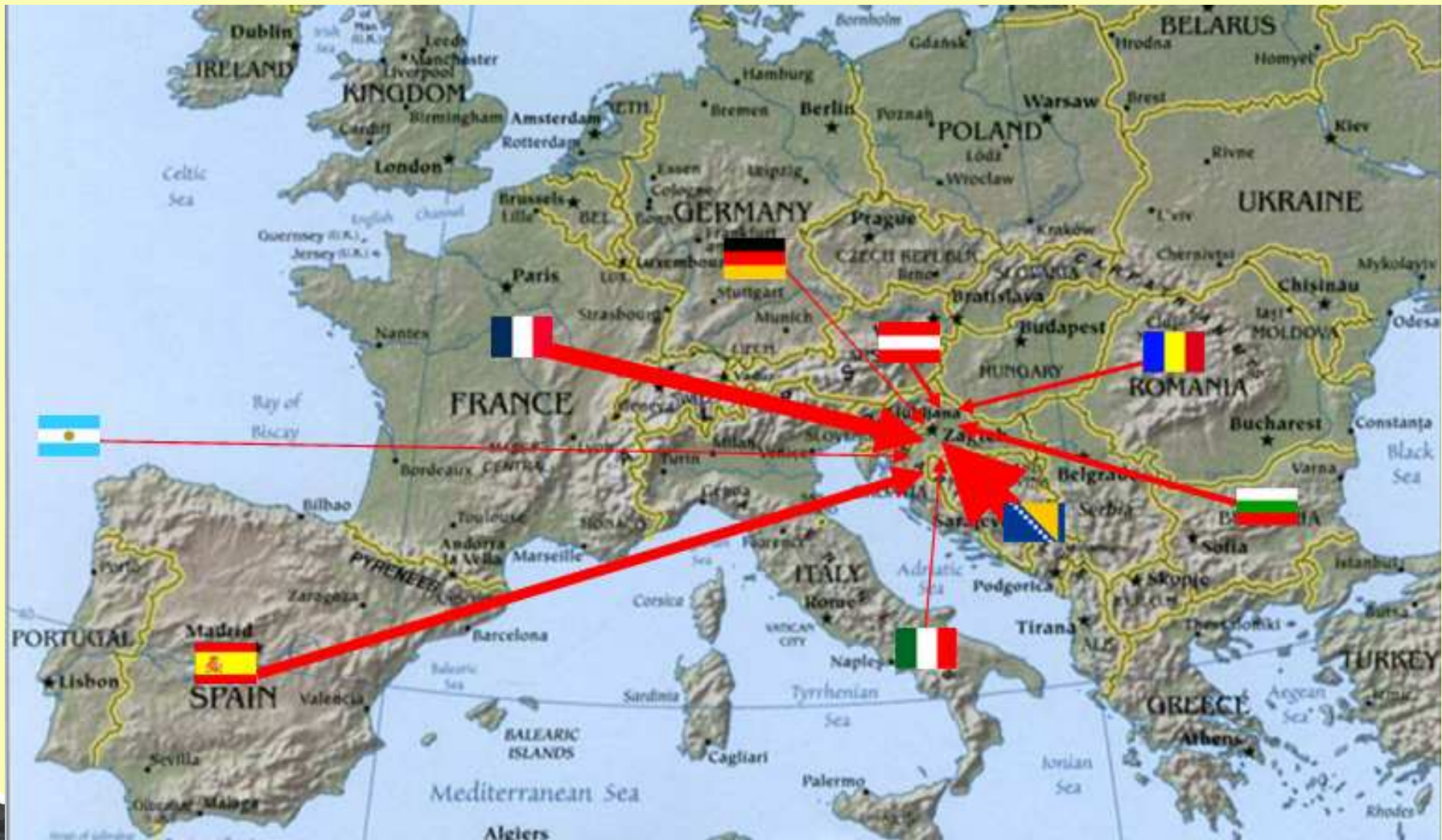
Charcoal in action



Charcoal Production



Charcoal Import

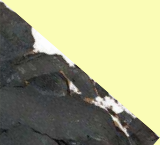


Charcoal and Biomass Market

- ➡ Subsidized **price of bioelectricity** in Hungary
0.063 – 0.1 €/kWh
- ➡ Increased **price of biomass** in the region for
30 – 50% (buyers from Italy, Slovenia,...)
- ➡ New **bioelectricity legislation** in Croatia:
0,083 – 0,12 €/kWh
- ➡ Fast-growing **pellet industry** in Croatia



Charcoal – Market issues

- ☞ **Consumer price up to 1 €/kg**
(Fuelwood app. 0,9 kn/kg; 1 € = 7,4 kn)
 - ☞ **Competition:**
 - South America (Brazil, Argentina),
 - South Africa,
 - Bulgaria, Bosnia, Serbia
 - ☞ **Challenges:**
 - Increase of production (demand)
 - Competitiveness (charcoal and fuel wood prices)
 - Overall (energy) efficiency of production
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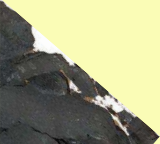


Charcoal producers in Croatia

Division based on production technique:

- ☞ Industrial producer
- ☞ Traditional producers

Division based on size:

- ☞ Part-time producers
 - ☞ Small & medium size producers
 - ☞ Industrial producer
- 

Part time (traditional) production



Registered small and medium scale production



Industrial production



Life cycle of charcoal



Charcoal production



Feedstock supply



Charcoal burning

Environmental impacts during charcoal life cycle ⁽¹⁾

Impacts caused by unsustainable forest management:

- deforestation
- erosion
- lowering soil fertility
- impacts on water cycle
- etc...



**Feedstock
supply**

Impact of feedstock supply in Croatia



Forest cover: 47,5%



Manage 78% of Croatian forest



- ☞ environmentally appropriate
 - ☞ socially beneficial
 - ☞ economically viable
- forest management**

Management data	1996 - 2005	2006 - 2015
	m ³	
Wood-stock	278 323 621	397 963 000
Annual increment	8 123 496	9 643 117
Annual falling	4 934 199	6 564 400

Environmental impacts during charcoal life cycle ⁽²⁾



Charcoal production



Impacts on human health

- related to the emissions of gases and particulate matter (dust) into the indoor working
- during the production management,
- unloading of kilns or combustion chambers,
- collection of charcoal ashes for charcoal-briquettes production

Emissions into the air

- CO₂
- CO
- CH₄
- NMHC
- VOC
- TSP, tars

Impacts of industrial charcoal production in Croatia

Industrial production in Belišće

Legal obligation on environmental monitoring:

- air emission monitoring
 - “medium sized combustion facility”
- water usage and emission monitoring
- waste production monitoring

Main problems include:

- Emission of particulate matter
- Occupational safety



Impacts of traditional charcoal production in Croatia

Traditional charcoal production

No legal obligation on environmental monitoring

= no data on environmental performance of the production

- a number of producers are not registered
- production facilities are of small scale and the emission limits are not defined by the Decree on the Limit Emission Values

Main problems include:

- Emission of particulate matter
- Occupational safety



Conclusions & Recommendations

