

**Regionalni edukacijski seminar na temu:
„POTICANJE PROIZVODNJE TOPLINSKE I RASHLADNE ENERGIJE IZ
OBNOVLJIVIH IZVORA ENERGIJE“**

u okviru IEE SUPPORT_ERS projekta: „OPTIMIZACIJA SUSTAVA POTICANJA KORIŠTENJA OBNOVLJIVIH
IZVORA ENERGIJE ZA PROIZVODNJU ELEKTRIČNE, TOPLINSKE I RASHLADNE ENERGIJE“

Energy from biomass – present and potential utilisation in Croatia



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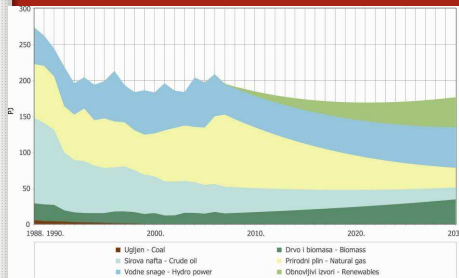
Zagreb, 25. rujan 2009.

Intelligent Energy  Europe

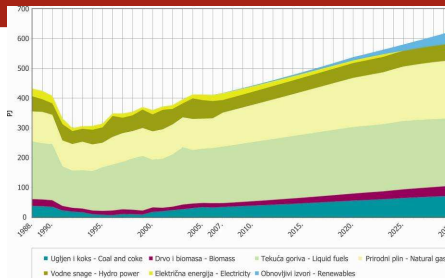
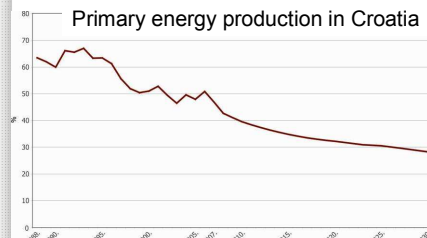
Contents

- Energy in Croatia
- Legal framework
- Biomass potential
- Biomass utilisation
- Biomass use for heating
- Barriers to increase biomass for heating
- Suggestions how to increase use of biomass for heating
- Conclusions

Primary energy supply in Croatia ...



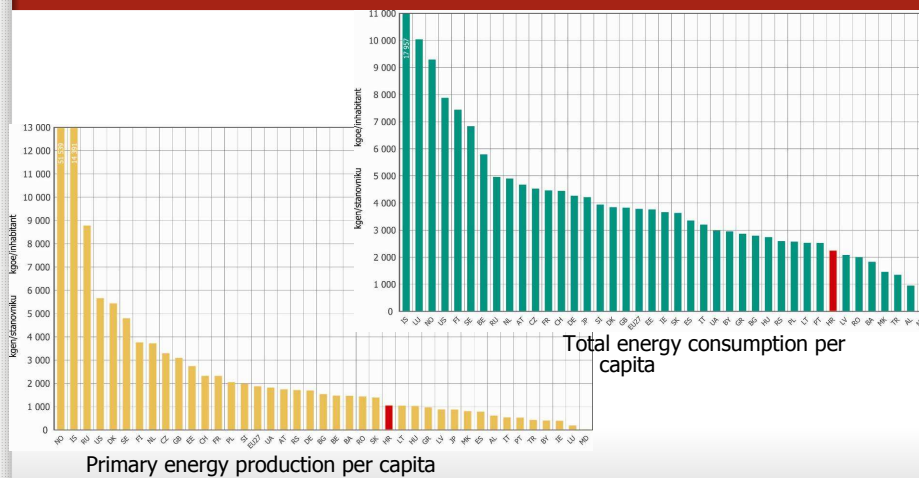
Primary energy production in Croatia



Total energy consumption in Croatia

Share of RES in 2007 (including large hydro, EUROSTAT methodology):
 Primary energy production: 751 400 toe (18.6%)
 Total consumption: 707 800 toe (7.6%)

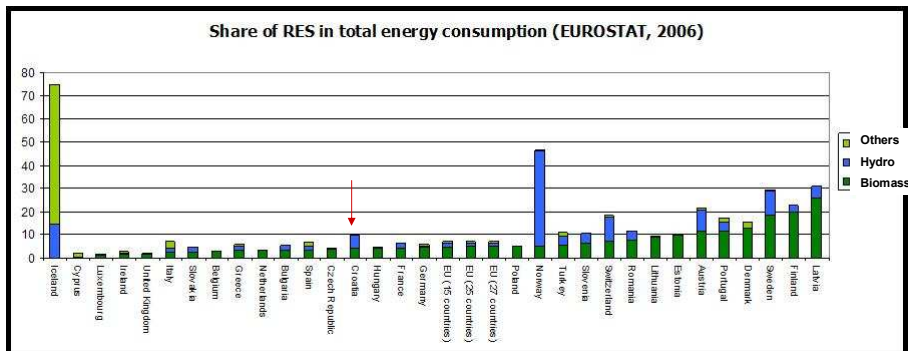
...and per capita in Croatia and Europe



Primary energy production per capita

Total energy consumption per capita

Share of RES (%)



Croatian legal framework for RES and biofuels

- Ordinance on Utilisation of RES and Cogeneration (OG 67/07)
- Ordinance on Gaining Eligible Producer Status of RES-E (OG 67/07)
- Tariff System for the Production of Electricity from Renewable Energy Sources and Cogeneration (OG 33/07)
- Ordinance on a Minimal Share of Incentivized Electricity Production from Renewable Energy Sources and Cogeneration (OG 33/07)
- Ordinance on Fees for Incentivizing Electricity Production from Renewable Energy Sources and Cogeneration (OG 33/07)
- Ordinance on Biofuels Quality (OG 141/05)
- Law on Biofuels for Transport (OG 65/09)
- **Legislation on RES-H still pending!**

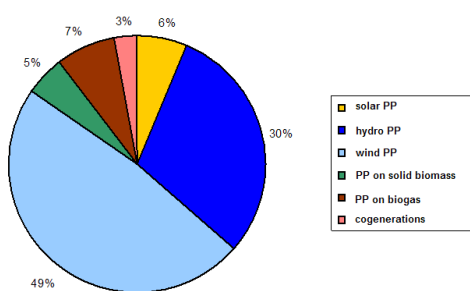
Feed-in tariffs & minimal share of RES-E and cogenerations

- Tariff system for RES-E and cogenerations

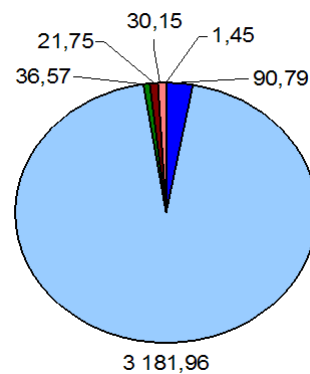
Type of power plant		Installed capacity [MWe]	Tariff item for 2009 [HRK/kWh]
Solid biomass PP	From forestry and agriculture (branches, straw, kernels...)	≤ 1	1.3064
		> 1	1.1322
	From wood processing industry (bark, saw dust, chips...)	≤ 1	1.0342
		> 1	0.9036
PP on biogas from energy crops, waste and residues from agriculture and food processing industry		≤ 1	1.3064
		> 1	1.1322
PP on liquid biofuels		≤ 1	0.3919
		> 1	0.3919
PP on landfill gas and waste water treatment gas		≤ 1	0.3919
		> 1	0.3919

- Ordinance on a Minimal Share of Incentivized Electricity Production from RES and Cogeneration (OG 33/07):
 - 5.8% from RES-E and 2% from cogenerations in 2010

Registry of RES & Cogeneration – status overview on 01/04/2009



176 applications for Eligible producer status of RES-E



Total installed capacity (MW)

Source: www.mingorp.hr

RES in Croatia (2007)

	Installed heat capacity	Installed power capacity	Power generation	Heat production
SOLAR	45.5 MW	56.08 kW	52.65 MWh	154.4 TJ
WIND	0	17.15 MW	34.91 GWh	0
BIOMASS	512* MW	2 MW	7.02 GWh	13 380 TJ
SMALL HYDRO	0	32.75 MW	83.0 GWh	0
GEOTHERMAL	36.7(113.9) MW	0	0	139.5 (558.5) TJ
TOTAL	556.3 (633.52) MW	51.95 MW	124.98 GWh	13.67 (14.09) PJ

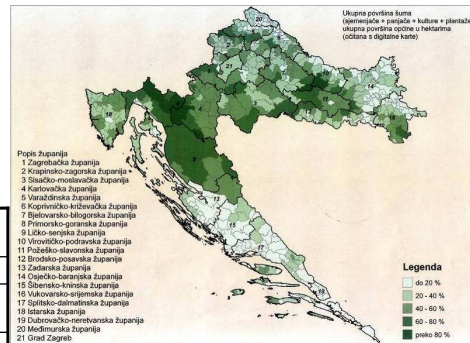
Biomass in Croatia

- **From feedstock side:**
 - Forest biomass
 - Agricultural biomass
 - Waste

Forest biomass

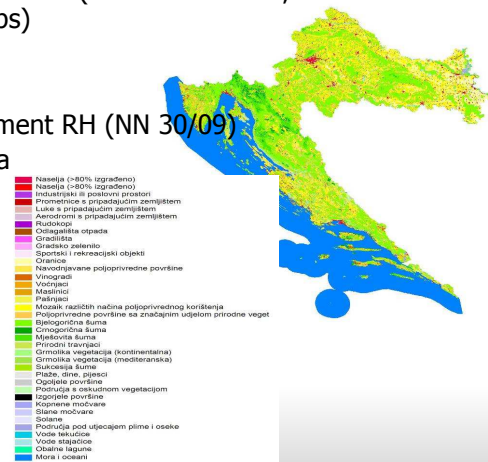
- Forest land: 47.5%
- Forests: 42%
- Currently 1.1 Mm³; potential 1.4 + 0.45 Mm³ from plantations till 2015 (HŠ-Croatian Forests, excluding bark and wood processing waste)
- 2.6 Mm³ (Croatian Biomass Association)
- 4.5 Mm³ + 1.0 Mm³ (Green Book)

Biomass type	Volume (Mm ³ /yr)	Energy (PJ)
Wood	1.89	24.33
Wood waste	0.70	8.65
Bark	0.21	2.01
Wood-processing industry waste	1.39	17.89
HR Waters, HR Roads, HEP	0.40	4.8
Energy plantations	1.00	12.88
Total	5.59	70.56



Agricultural biomass

- Croatian Bureau of Statistics: 1.2 Mha (71% arable land, 22% meadows and pastures, 7% perennial crops)
- Habitat map (DZZP) – 1.6 Mha
- CORINE (AZO) – 2.4 mil ha
- Strategy of sustainable development RH (NN 30/09)
 - Potential arable land 2.1 Mha
 - Currently utilised 1.1 Mha
- Energy strategy (Green book)
 - Target for biofuels: 344 031 t (8.91 PJ) till 2020
 - Potential of wood residues from agriculture: 2.9 Mm³ (22.93 PJ)



Waste

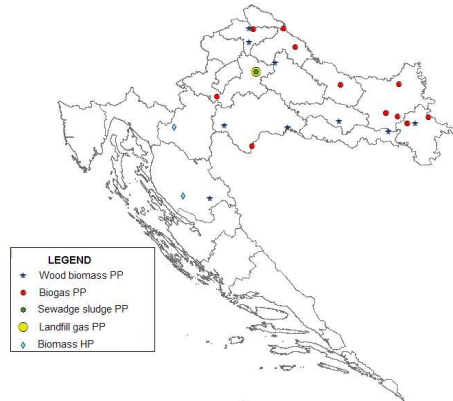
- Municipal waste: 4.5 M inhabitants + 11.2 M tourists during summer season
- Strategy of Waste Management in Croatia (OG 130/05)
- Plan of Waste Management in Croatia for period 2007 – 2015 (OG 85/07)
 - Establishment of regional and county's Centres for Waste Management (CGO) in 2011
- Energy Strategy (Green Book)
 - 200 GWh_e till 2020 (municipal waste)
 - Waste edible oil – 3 800 t of biodiesel potential

Strategy of energy development of Croatia – White Book draft

- 20% gross direct consumption from RES in 2020
- Biomass: ~ 32 PJ; 85 MW power plants
- Biofuels: 10% (8.91 PJ) of energy consumption in transport, eq. 340 000 t/yr
- Biogas: assumed 5% of utilisation of livestock units; 650 TJ (26 Mm³)
- **Absence of clear use of biomass for heat**

Projects and existing capacities (1)

- Solid biomass power plants
 - 9 projects (PEO); 36.6 MW
- Power plants on biogas
 - 2 EO - PZ Osatina (1MW), BIOINTEGRA d.o.o. (1MW)
 - 11 PEO
 - Total 23.8 MW
- Waste sewage sludge power plant
 - Zagrebačke otpadne vode (ZOV) 2 x 1.5 MW
- Landfill gas power plant
 - Biomoto d.o.o. 2 MW
- Biomass heating plants
 - Gospić (1MW), Ogulin (1MW)



Projects and existing capacities (2)

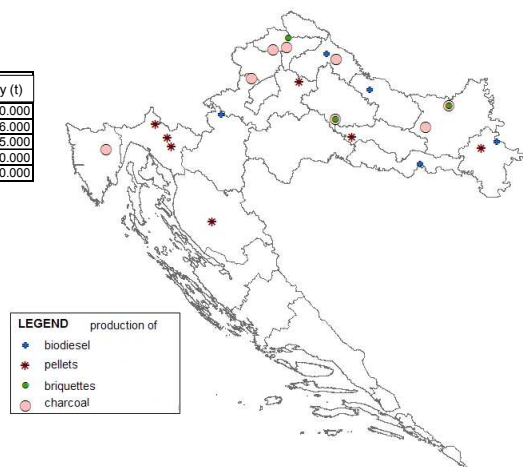
- Biodiesel production
 - 4 300 t (2007)

Project holder	Location	Status	Capacity (t)
Modibit d.o.o.	Ozalj	Existing	20.000
Vitrex d.o.o.	Virovitica	Existing	6.000
Energospektar d.o.o.	Vukovar	Existing	45.000
Biona	Koprivnica	EIS	100.000
Bio-adria	Slavonski Brod	EIS	150.000

- Pellet production
 - ~ 41 000 t (2007)

Project holder	Location	Capacity (t)
Energy Pellets	Delnice	30.000
Finvest d.d.	Gerovo	20.000
Adriadrvo d.o.o.	Gradec	10.000
Gamauf d.o.o.	Lipik	75.000
Divenjata d.o.o.	Mrkopalj	7.300
Viševica Komp d.o.o.	Perušić	20.000
Spačva d.o.o.	Vinkovci	50.000

- Wooden briquette production
 - ~ 27 500 t (2007)
- Charcoal production
 - ~ 6 000 t (2007)



Biomass for heating

USE:

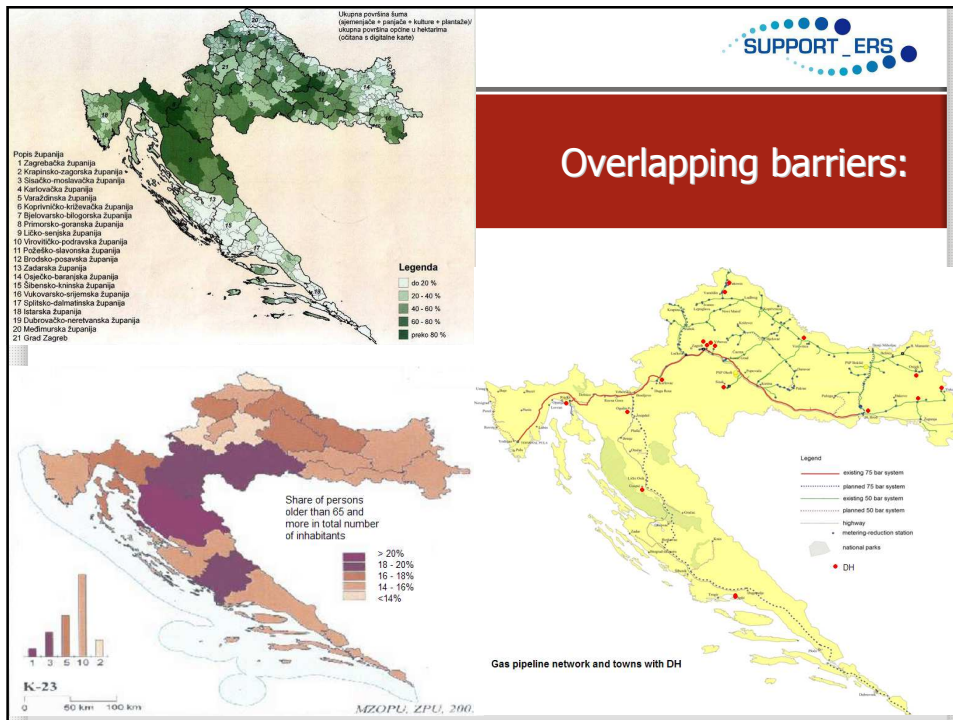
- Currently: ~1.3 – 1.5 Mm³ of fuelwood
 - Rural areas
 - Traditional low efficient stoves
- Negligibly use of pellets
- Industrial cogeneration – wood processing industry

SUPPLY:

- Pellet production:
 - ~ 150 000 t/yr production capacity
 - ~ 40 000 t produced in 2007
 - ~ 95% exported
- Briquettes production:
 - ~ 30 000 t in 2007
 - ~ 85% exported
- Wood chips:
 - Available at 35 €/t from Šumska biomasa d.o.o. by end of 2009
 - Largely exported from wood-processing industry

Barriers for use of modern biomass for heating

- Low competing prices of heat:
 - DH sector has regulated prices of heat sold while it acquires inputs at market prices – low or no profitability
 - Well developed gas pipeline network in areas abundant with forests



EIHP

SUPPORT_ERS

Overlapping barriers in terms of heat prices:

- DH: regulated prices
- Household heating:
 - Natural gas vs. Pellets: pellets equal or a bit less than natural gas prices per MJ (fuel only)
 - Investment:
 - Wood stove vs. Pellets stove...

Energy prices (2009)

FUEL (retail sale):

- Fuel wood: 34-41 €/m³
- Wood pellets: 180 €/t
- Wood briquettes: 108 €/t
- Natural gas (households): 0.3356 €/m³
- Heating oil: 0.615 €/l

ENERGY (average for households):

- Electricity: 0.0833 €/kWh
- Heat (DH): 0.0284 €/kWh + 2.159 €/kW

1.965 kn ≈1.500 kn ≈11.000 kn >17.000 kn



LA NORDICA DORELLA BON
Dimenzije : 465x845x491
Težina : 90 kg
Snaga : 6,5 kW



Tehnički podaci	
Dimenzije (VxŠxD)	85 x 95 x 60 cm
Masa (kg)	92 kg
Snaga (kW)	5 kW
Pečnica (VxŠxD)	21 x 39,5 x 47 cm
Odvod dimnih plinova (Ø mm)	cijev Ø 118 mm unutarnjeg promjera, gore i sa strane, lijevo i desno
Gorivo	drvo, drveni briketi, briketi ugljena

- Peč na pelet 9 kW učinak za cca 50-70 m² prostora
- Spremik 18 kg goriva.
- Potrošnja 0,56 -1,99 kg/h.
- Autonomnost uređaja 9 - 32 sata.
- Stupanj iskorištenja 88 - 90%
- Dimnjak fi 80 mm.
- Regulacija je automatska upravljanje daljinskim upravljačem.
- Jamstvo 2 godine, servis osiuran.

Pellet heating system

15-50 kW

Very few information, no heating efficiency...

Pribor za loženje peletima

Oprema za centralno grijanje Cm Pelet-set namijenjena je za ugradnju na nove ili već prije ugrađene ložišne kotlove Centrolini, EKO-CK i EKO-CBK nazivnog toplinskog učina od 14 do 50 kW. Cm Pelet-seti ložišne kotlove čine jednu funkcionalnu cjelinu, "trixi postrojenje" predviđeno za loženje drvenim peletima. Automatizirani su s "trixi postrojenjem" pruža korisniku završni kontrolni i čiji postrojenja prilagođeni za široku primjenu. Sa širokim funkcionalnim opremama u vidu nozama za loženje za spregu ili direktno izlaze u grijanje dok su u potrošnji goriva do 40% isplativija od svih ložišta EL ložišnih oprema. Peletni materijal i obnovljive izvore energije te su uključiti u većinu prihvatljivo gorivo.



Karakteristike Cm Pelet-seta:

- Isporučuje se pripremljeno za ugradnju na nove ili već ugrađene ložišne kotlove Centrolini, EKO-CK i EKO-CBK nazivnog toplinskog učina od 14 do 50 kW.
- S ložišnim kotlom čini jednu funkcionalnu cjelinu, "trixi postrojenje" namijenjeno za loženje peletima.
- Radom "trixi postrojenja" upravlja digitalna regulacija, koja pruža korisniku sigurnost i završni kontrolni.
- Ventilator električno napajani u palamniku, vodeni regulator, automatski peletni peletni te održava peletni.
- Ušteda u gorivu i do 40 % u usporedbi sa sustavom grijanja EL ložišta.
- Čišćenje iz sektora grijanja, ovjeto o snazi kotla i kvaliteta peleta nakon jednog potrošnog spremnika u trajanju od pet minuta.
- Spremnici peleta su namijenjeni za praćenje, a završni se prema potrebi mogu stoniti.
- Isporučuje se u više dijelova pa su jednostavni za transport i unosi u prostor predviđen za ugradnju.
- Isporučuje se u skladu s normom EN 300-1 i ISO 9001/2005.

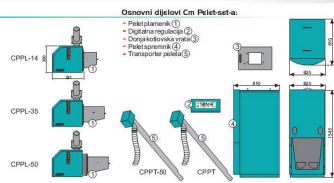
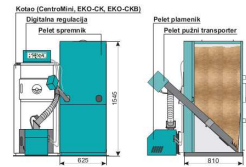
Karakteristike goriva - drvenih peleta:

- Drveni pelet ispodlija u obnovljivi izvor energije. Može značajno su ekološki vrlo prihvatljivi.
- Namijenjeni su za loženje u različitim vrstama ložišta, u rasponu od 10 do 50 kW.
- Peletni materijal namijenjen za loženje u različitim vrstama ložišta, u rasponu od 10 do 50 kW.
- Isporučuje se u skladu s normom EN 300-1 i ISO 9001/2005.
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Cm Pelet-set 14-50 kW

Centrolini



Model	14	20	25	30	35	40	50
Tip planirana	CPPL-14	CPPL-20	CPPL-25	CPPL-30	CPPL-35	CPPL-40	CPPL-50
Topinski učini (kW)	14	20	25	30	35	40	50
Tip kotla - EKO-CK / CKB	Centrolini	Centrolini	Centrolini	Centrolini	Centrolini	Centrolini	Centrolini
Volumen sprem. peleta (lit)	375	375	375	375	375	375	375
Visina spremnika peleta (mm)	1540	1540	1540	1540	1540	1540	1540
Širina spremnika peleta (mm)	625	625	625	625	625	625	625
Prilagodljivi raspari (lit)	2000	2000	2000	2000	2000	2000	2000
Širina kotla (mm)	526	526	526	526	526	526	526
Dizajn kotlova vrata za pelet planirana	CPPL-14	CPPL-20	CPPL-25	CPPL-30	CPPL-35	CPPL-40	CPPL-50

Measures needed to fasten development of modern biomass market

- Educational campaigns
- Promotional material
- Subsidized investment / replacement of old, inefficient stoves
- Development of pellet supply network
- Support of modern biomass production to be placed at domestic market
- Development of rational wood waste utilisation

Thank you for your attention!



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