Third International Forum: Energy for Sustainable Development

Capacity Building for Energy Efficiency and Access to Cleaner Energy in Central Asia and Neighbouring Regions

CASE STUDY
ON ENERGY EFFICIENCY FINANCING
- Croatia -

Željko Jurić, M.Sc.
Energy Institute Hrvoje Požar

Kyrgyzstan, Issyk Kul Lake, 12-14 September 2012

Content

1. Introduction – Energy profile of Croatia

2. Existing legislation and policies in your country: are they helpful or harmful for promotion of EE investments?

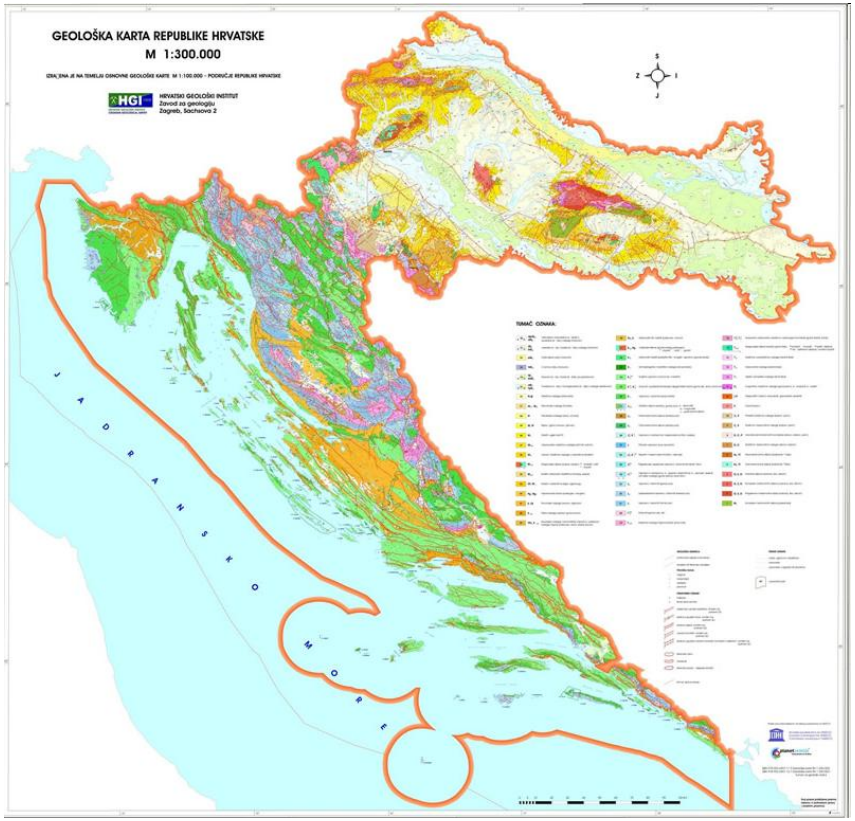
3. National and local authorities, governmental institutions: what is their impact on EE market development?

4. What incentive mechanisms have been introduced recently to promote financing of EE projects in your country? Are they working?

5. What needs to be done to make large-scale EE investments a reality? Proposals for next steps

Introduction

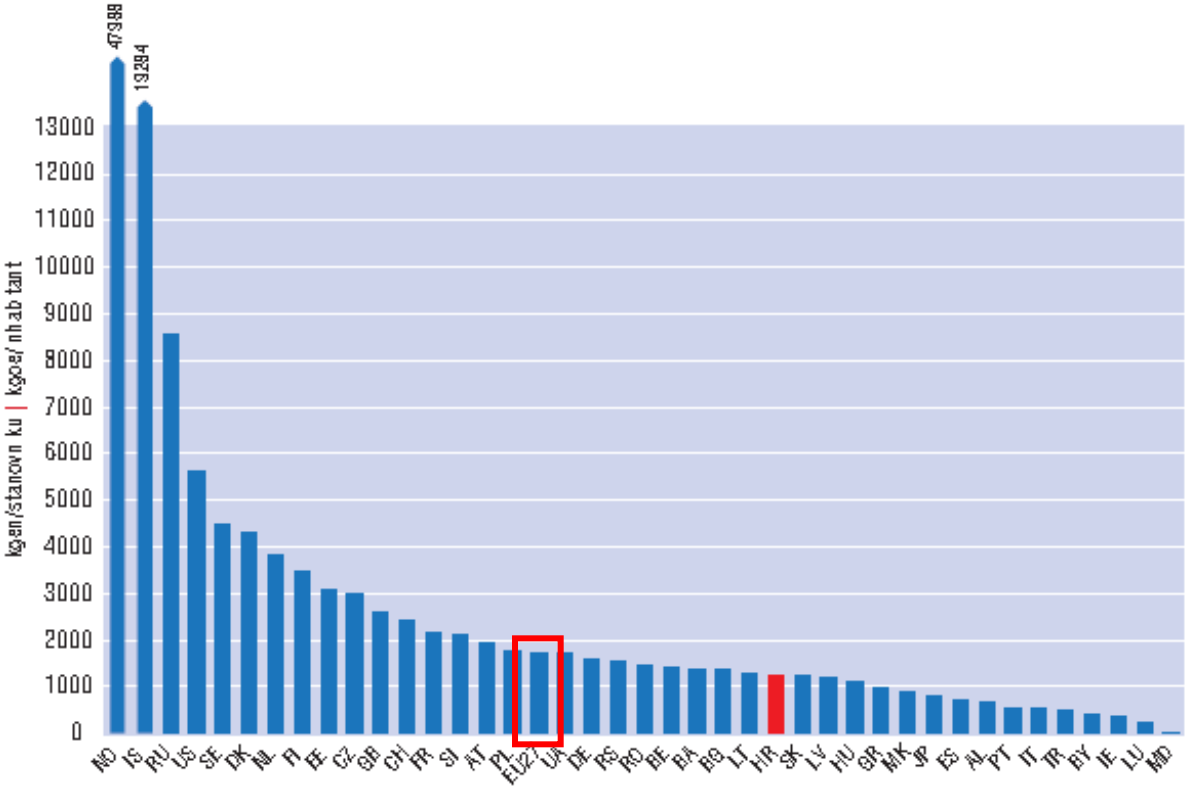
- Population: 4 437 460



Energy data for 2010:

- Primary energy production: 228.57 PJ
- Total primary energy supply: 411.68 PJ
- Primary energy self supply: 55.5%

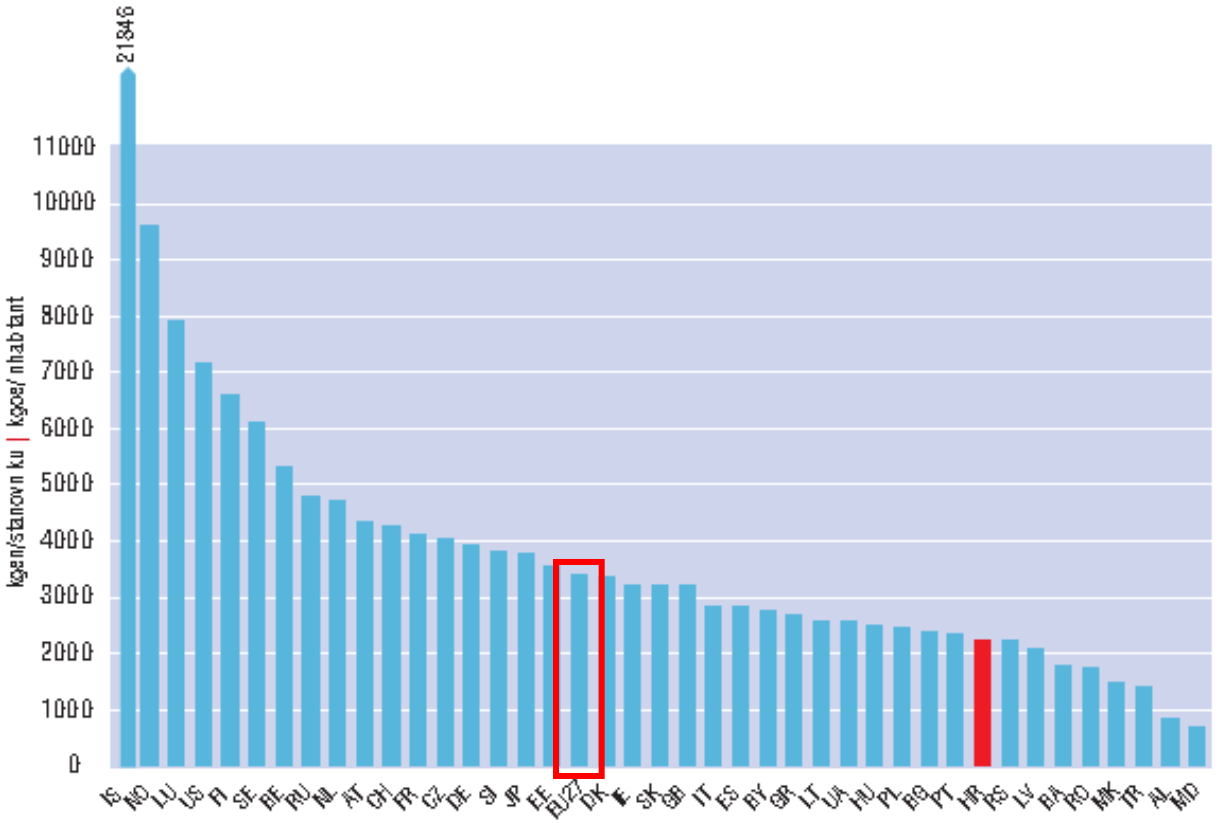
Primary energy production



Slika | Figure 2.2.3. Proizvodnja primarne energije po stanovniku | Primary energy production per capita

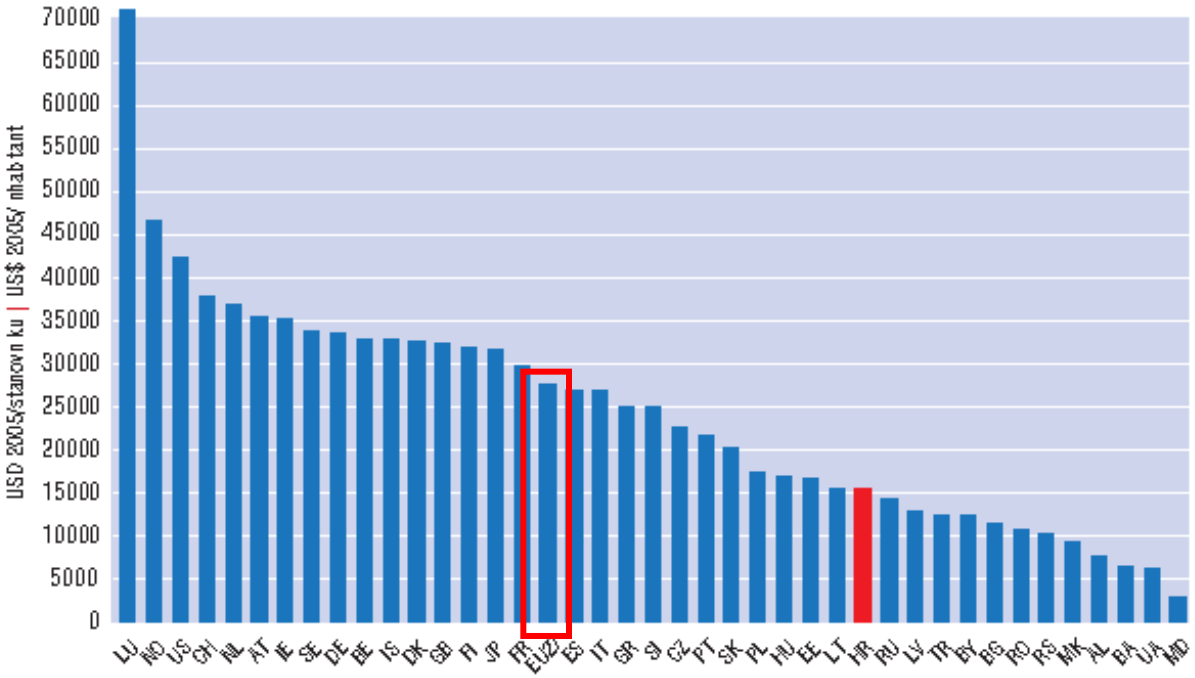
Izvor | Source: EIHP

Total primary energy supply (TPES)



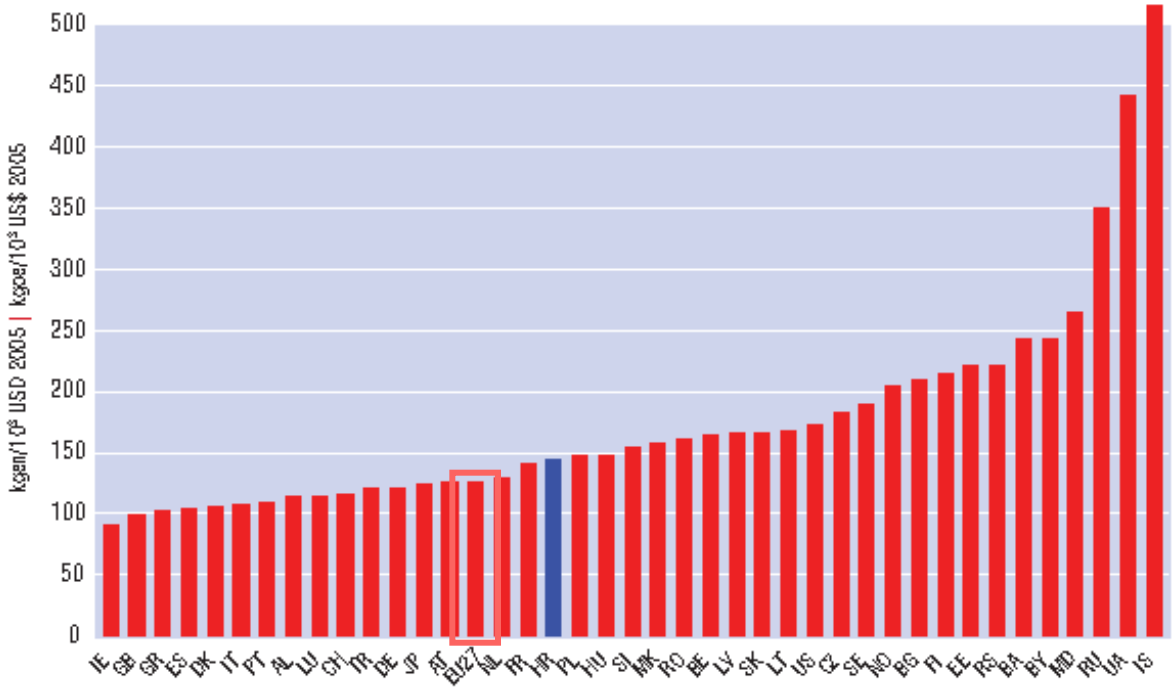
Slika | Figure 2.4.3. Ukupna potrošnja energije po stanovniku | Total primary energy supply per capita
Izvor | Source: EIHP

Gross domestic product (using PPP)



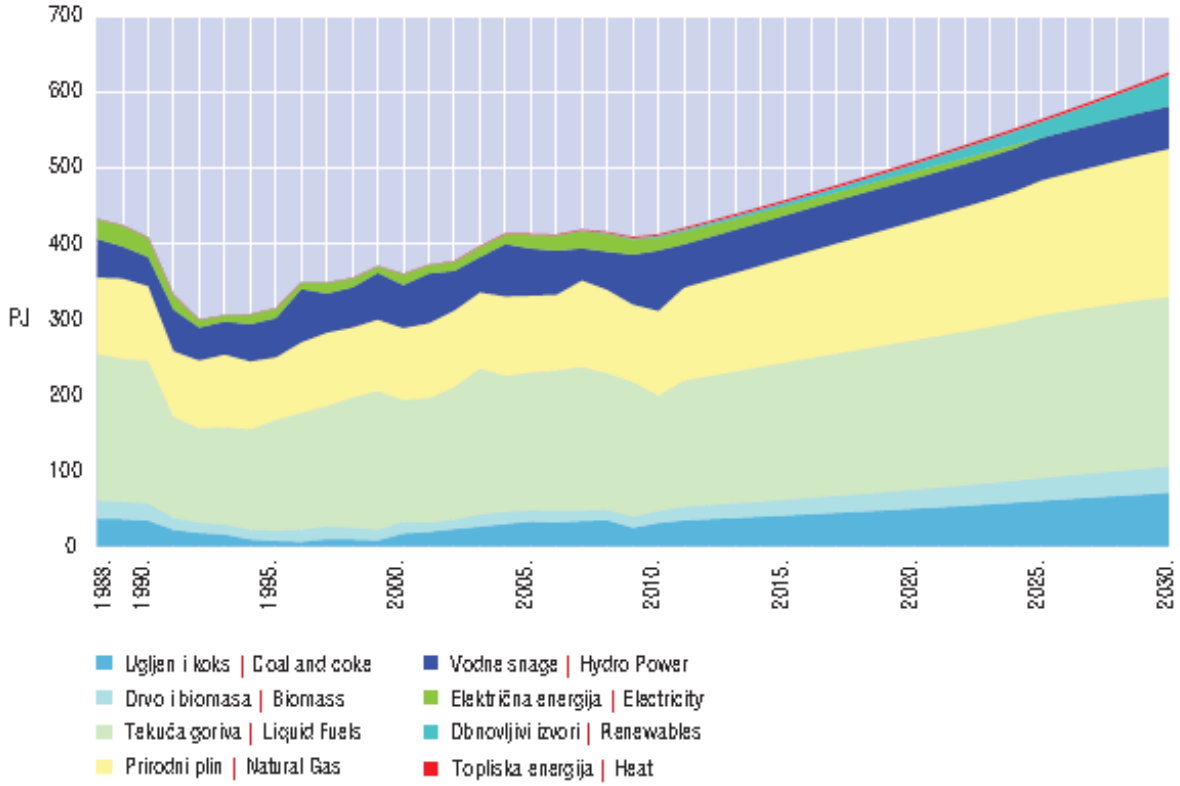
Slika | Figure 2.1.4. Bruto domaći proizvod po stanovniku - PKM | Gross domestic product per capita - PPP
Izvor | Source: EIHP

TPES intensity



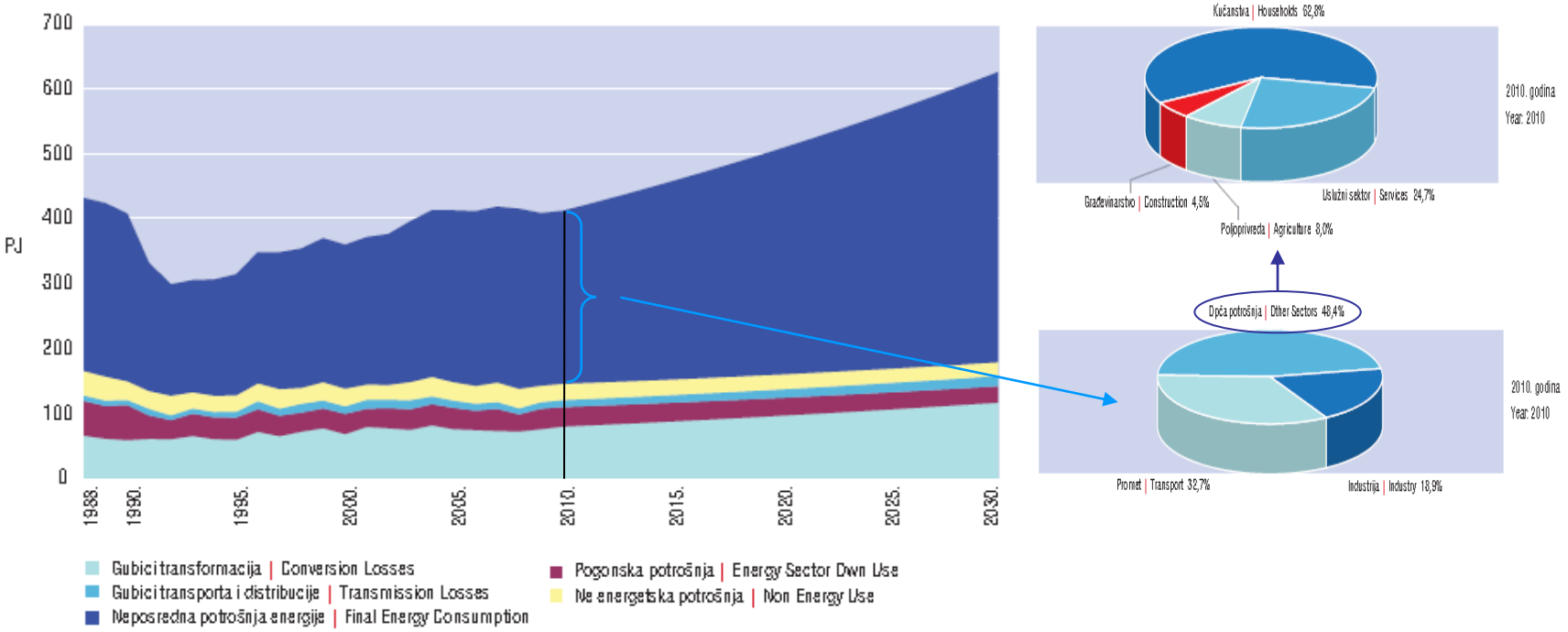
Slika | Figure 2.1.5. Energetska intenzivnost ukupne potrošnje energije - PKM | Total primary energy supply intensity - PPP
Izvor | Source: EIHP

TPES by energy forms



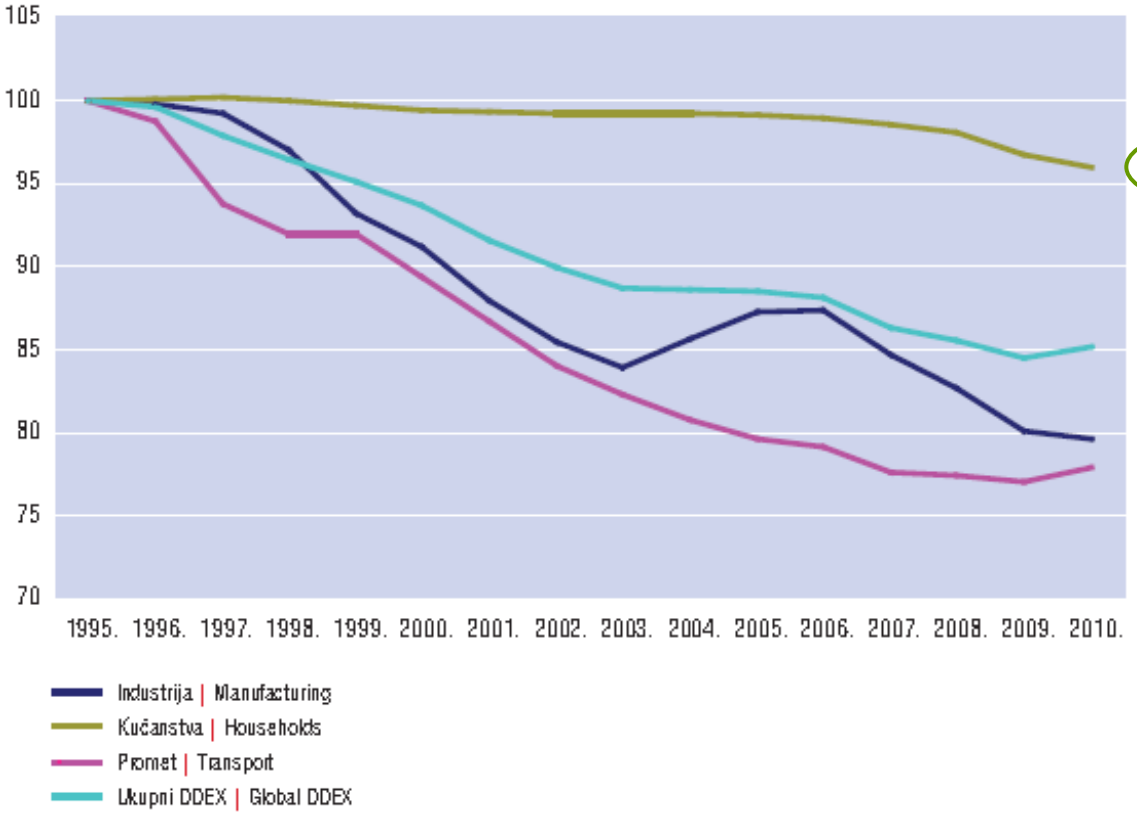
Slika | Figure 2.4.1. Ukupna potrošnja energije u Hrvatskoj | Total Primary Energy Supply in Croatia
Izvor | Source: EIHP

TPES by sectors



Slika | Figure 2.10.1. Struktura ukupno utrošene energije | Total primary energy supply by sectors
Izvor | Source: EIHP

Energy efficiency index



Households

Total index

Man. industry

Transport

Slika | Figure 9.1.1. Indeks poboljšanja energetske učinkovitosti ODEX za sve sektore potrošnje u razdoblju od 1995. do 2010. godine | Energy efficiency index ODEX for all sectors between 1995 and 2010
Izvor | Source: EIHP

Existing legislation and policies in Croatia: are they helpful or harmful for promotion of EE/RES investments?

- Since 2007 Croatia has undergone a long way in development and implementation of EE and RES legislation
- Progress made has resulted with creation of regulatory framework almost completely harmonized with EU legislation

Significant improvements in the last few years!

Existing legislation and policy are helpful for promotion of EE/RES investments.

Existing legislation and policies in Croatia
- ENERGY EFFICIENCY -

- **The Act on Efficient Utilization of Energy in Final Consumption (OG 152/08, 55/12) was adopted, based on:**
  - EU Directives (2002/91/EC old & 2010/31/EU new) on the energy performance of buildings (EPBD)
  - EU Directive (2006/32/EC) on energy end use efficiency and energy services (ESD)
- **Defines energy efficiency measures (especially energy services, energy audits and energy certification of buildings) and obligations of the public sector, energy companies and large consumers**
- **The most of missing sub-laws were adopted this year (2012)**

Recent policy developments - ENERGY EFFICIENCY

The Act on Efficient Utilization of Energy in Final Consumption (OG 152/08, 55/12)

- Ordinance on information system for energy efficiency
- Ordinance on the Methodology for Calculation of Energy Savings in the Final Consumption (OG 40/10)
- Ordinance on the Methodology for Monitoring, Measurement and Verification of Energy Savings (OG 77/12)
- Ordinance on Energy Audits of Structures and Energy Certification of Buildings (OG 81/12)
- Ordinance on the Requirements and Criteria to be Met by Energy Auditors and Energy Certifiers (OG 05/11)
- Ordinance on Control of Energy Certification of Buildings and Energy Audits Reports (OG 81/12)
- Ordinance on Contracting and Implementation of Energy Services in Public Sector (OG 69/12)
- Ordinance on Determining Ecodesign Requirements for Energy-Related Products (OG 97/09)
- Ordinance on Energy Efficiency Requirements for Ballasts of Fluororcent Lightning (OG 32/09)

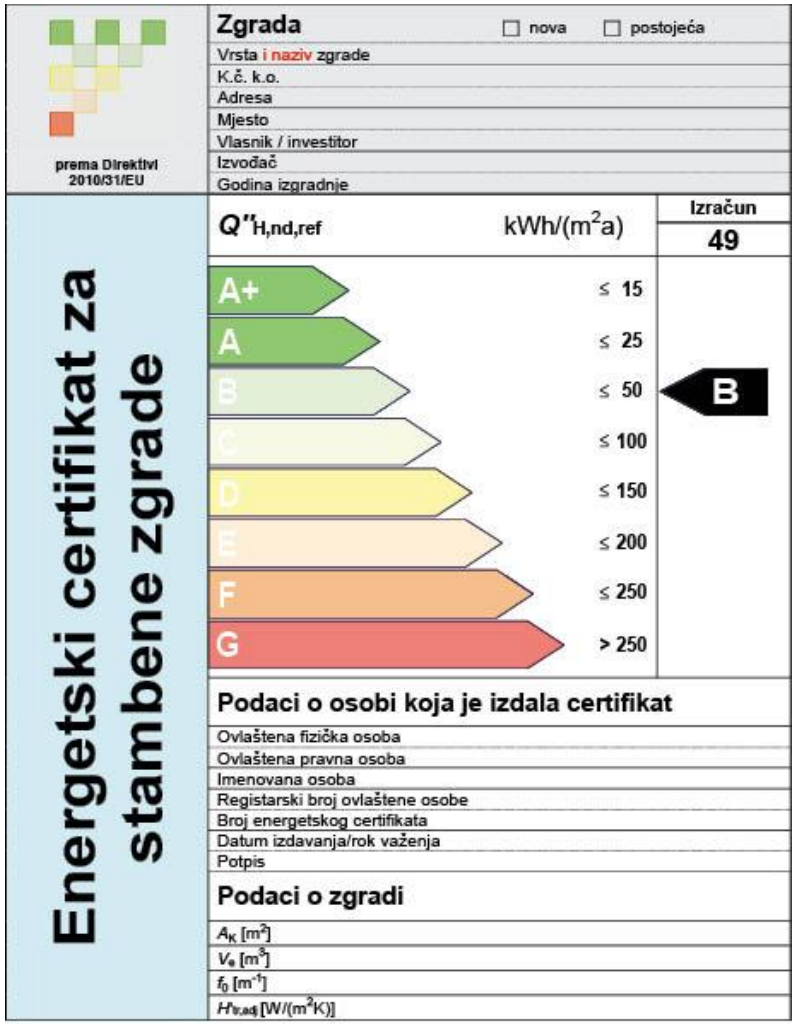
Adopted

In draft

Recent results - ENERGY EFFICIENCY

- **Energy certification of residential and non-residential buildings started from April 2010 in Croatia.**
  - Developers of a new building must obtain an energy certificate before the technical audit, as a part of usage permit documentation.
  - An energy certificate of existing buildings should be prepared, in case of selling, leasing or renting, at latest when Croatia joins the EU (energy certificate is an integral part of contract).
  - Energy certificate is based on energy audit and calculated energy demand for space heating, conducted by an authorized experts.
  - Energy certificate on 5 pages presented energy performance of a building and economically feasible measures to improve energy efficiency.
  - Classification of buildings in energy classes from A+ ($\leq$ 15 kWh/m^2) to G (>250 kWh/m^2), according to the energy demand for space heating.

Recent results - ENERGY EFFICIENCY



prema Direktivi 2010/31/EU

Energetski certifikat za stambene zgrade

Zgrada ☐ nova ☐ postojeća

Vrsta i naziv zgrade
K.č. k.o.
Adresa
Mjesto
Vlasnik / investitor
Izvođač
Godina izgradnje

$Q''_{H,nd,ref}$	kWh/(m²a)	Izračun
		49
A+	≤ 15	
A	≤ 25	
B	≤ 50	B
C	≤ 100	
D	≤ 150	
E	≤ 200	
F	≤ 250	
G	> 250	

Podaci o osobi koja je izdala certifikat

Ovlaštena fizička osoba
Ovlaštena pravna osoba
Imenovana osoba
Registarski broj ovlaštene osobe
Broj energetskog certifikata
Datum izdavanja/rok važenja
Potpis

Podaci o zgradi

A_K [m²]
V_e [m³]
f_0 [m⁻¹]
$H'_{tr,adj}$ [W/(m²K)]

Klimatski podaci

Klimatski podaci (kontinentalna ili primorska Hrvatska)	
Broj stupanj dana grijanja SD [Kd/a]	
Broj dana sezone grijanja Z [d]	
Srednja vanjska temperatura u sezoni grijanja θ_e [°C]	
Unutarnja projektna temperatura u sezoni grijanja θ_i [°C]	

Podaci o termotehničkim sustavima zgrade

Način grijanja zgrade (lokalno, etažno, centralno, daljinski izvor)	
Izvori energije koji se koriste za grijanje i pripremu potrošne tople vode	
Način hlađenja (lokalno, etažno, centralno, daljinski izvor)	
Izvori energije koji se koriste za hlađenje	
Vrsta ventilacije (prirodna, prisilna bez ili s povratom topline)	
Vrsta i način korištenja sustava s obnovljivim izvorima energije	
Udio obnovljivih izvora energ. u potrebnoj toplinskoj energiji za grijanje [%]	

Energetske potrebe

	Za referentne klimatske podatke		Za stvarne klimatske podatke		Zahtjev	
	Ukupno [kWh/a]	Specifično [kWh/m²a]	Ukupno [kWh/a]	Specifično [kWh/m²a]	Dopušteno [kWh/m²a]	Ispunjeno DA/NE
$Q_{H,nd}$						
Q_W						
$Q_{H,ls}$						
$Q_{W,ls}$						
Q_H						
E_{del}						
E_{prim}						
CO_2 [kg/a]						

Objašnjenje: ☐ obavezna ispuna ☐ ispunjava se opcijski

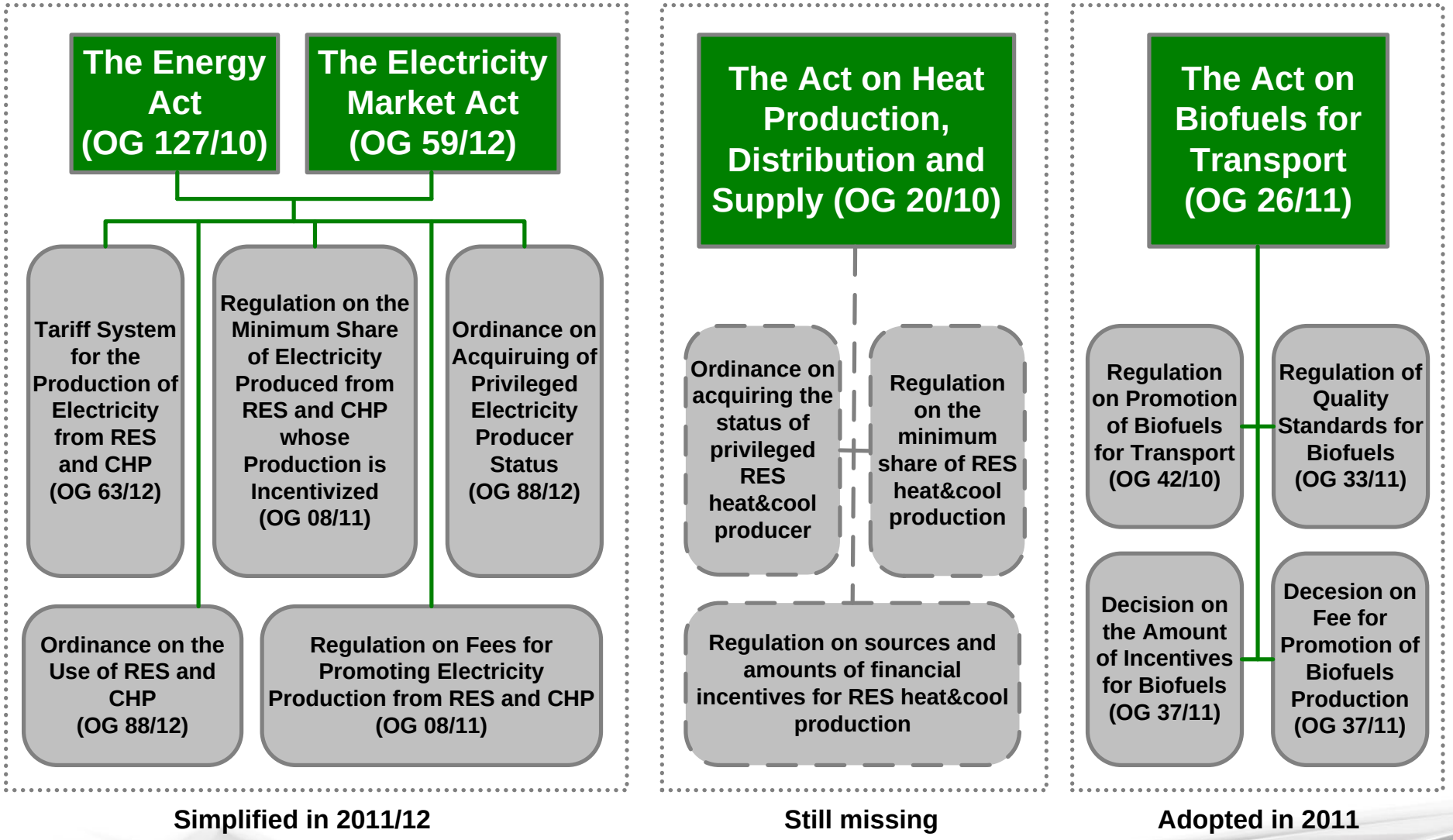
Građevni dio zgrade	U [W/(m²K)],	U_{max} [W/(m²K)],	Ispunjeno DA/NE
Vanjski zidovi, zidovi prema garaži, potkrovlju			
Ravni i kosi krovovi iznad grijanog prostora, stropovi prema potkrovlju			
Zidovi prema tlu, podovi prema tlu			
Stropovi iznad vanjskog zraka, stropovi iznad garaže			
Zidovi i stropovi prema negrijanim prostorijama i negrijanom stubištu temperature više od 0 °C			
Prozori, balkonska vrata, krovni prozori, prozirni elementi pročelja			
Vanjska vrata s neprozirnim vratnim krilom			

Objašnjenje: ☐ obavezna ispuna

Existing legislation and policies in Croatia
- RENEWABLE ENERGY SOURCES -

- **The Energy Strategy of the Republic of Croatia was adopted in October 2009.**
- **RES targets for 2020: 20% of RES in gross final energy consumption**
  - 35% of RES in electricity generation (including large hydro power plants) or 9.2% in gross final energy consumption
  - 10% of RES in transportation or 2.2% in gross final energy consumption
  - 20% of RES in heating and cooling or 8.6% in gross final energy consumption
- **The Act on Renewable Energy Sources**
  - Status: first draft
  - The RES Act should be adopted by the end of 2012

Recent policy developments - RENEWABLES



Simplified in 2011/12

Still missing

Adopted in 2011

Recent RES results - Privileged Electricity Producers

- **Register of RES projects (date: 7 Sept. 2012):**
  - 93 biomass plants (234 MW) - 3 implemented (6.7 MW)
  - 62 biogas plants (89 MW) - 8 implemented (8.6 MW)
  - 1 geothermal plant (5 MW) - 0 implemented
  - 64 small hydro power plants (126 MW) - 2 implemented (30 kW)
  - 111 wind power plants (4 690 MW) - 9 implemented (129.8 MW)
  - 292 solar plants (83 MW) - 68 implemented (2.2 MW)
- **Total RES projects in the Register:**
  - 632 plants (>5.2 GW) in the RES register
  - 90 plants (147.3 MW) have feed-in tariffs

Recent RES results - FEEI project

- **FEEI project:**
  - EIHP has contacted more than 100 EE/RES potential project developers, presenting the regional UNECE project and the possibilities which should be given through the equity and/or mezzanine financing by expected Investment Fund.
- **Results:**
  - Project Pipeline Summary with indicative borrowing requirements for **46 potential projects** (16 biomass plants, 12 biogas plants, 10 wind power plants, 4 solar collectors or PVs, 1 geothermal heat pumps and 3 energy efficiency projects)
  - Project Identification Forms for **15 RES project proposals** (4 biomass plants, 4 biogas plants, 6 wind power plants and 1 PVs)

National and local authorities, governmental institutions: what is their impact on EE market development?

- **There are strong interconnections among national and local authorities.**
  - National government brings strategies and action plans on national level, but the implementation is on the local level.
  - Local authorities are mostly responsible for assessing needs for energy efficiency improvements in public buildings and new infrastructure.
- **A good example of cooperation of national and local authorities is implementation of Retrofitting programme for public sector buildings**
  - Partners: Ministry of Construction and Physical Planning, Centre for Monitoring Business Activities in the Energy Sector and Investments, Croatian Bank for Reconstruction and Development, UNDP, Croatian Fund for Environmental Protection and Energy Efficiency, national, regional and local authorities and other public sector actors
  - Budget (2012) is around 675 000 EUR
  - Main beneficiaries: owners, users and managers of public buildings, service providers (consultants, engineering companies, ESCO companies) and financial institutions.

National and local authorities, governmental institutions: what is their impact on EE market development?

- **Retrofitting programme for public sector buildings (04/2012-12/2013)**
  - Overall objective of the programme is implementation of economically feasible, energy efficient technologies and measures in the public buildings.
- **Goals:**
  - 30-60% of energy savings for every reconstructed building
  - Implementation of renewable energy sources in buildings
  - GHG and other pollutant emission reduction
  - Local development
- **Financing:**
  - ESCO model - when volume of the investment is smaller than expected benefits of energy saving measures in future period
- **Results:**
  - Development of energy service market
  - Introduction of energy efficiency principles into public procurement
  - Development of information system for monitoring and management of energy consumption in public sector

What incentive mechanisms have been introduced recently to promote financing of EE/RES projects in Croatia?

- **Are they working? Yes! But, there is space for improvement!**
- **The Environmental Protection and Energy Efficiency Fund - extra-budgetary fund that finances projects/programmes/measures for the purpose of environmental protection, increase of EE and usage of RES.**
- **The Croatian Fund supports the implementation of EE/RES projects through occasional tenders. In 2010, there was a possibility to use following financial instruments:**
  - Soft Loan: up to 40% of eligible costs or up to 187000 EUR, zero interest rate, repayment (grace period 2 years, payback 5 years)
  - Interest Subsidy: 2% decrease of the stipulated interest rate (up to 107000 EUR per project)
  - Financial Aid (i.e. grant): for units of local/regional self-government 40%/60%/80% of eligible costs (up to 187000 EUR per project)
  - Donation: up to 21400 EUR, for promotion, research and development
  - Financial Aid or Subsidy for energy audits (up to 10700 EUR per audit)

What incentive mechanisms have been introduced recently to promote financing of EE/RES projects in Croatia?

- **Presented Croatian Fund's financial instruments are mostly oriented to companies, local/regional self-governments and other institutions. The support of natural persons in financing RES installations has started to develop in cooperation with some Croatian counties in 2008.**
- **Support by counties:**
  - Tenders for RES projects implementation for 2010 and 2011 include solar thermal collectors, heat pumps, small-scale biomass boilers, small wind turbines and photovoltaic household systems.
  - Incentives per RES installation usually amounted to 40% of the investment & installation costs (max. EUR 1600 in Karlovac county, tender 2011).
- **Financial institutions have started to offer soft "green" credit lines for energy efficiency in buildings.**
- **Some cities terminated communal charges for construction of buildings ranked in classes: A+ and A, where are energy consumption for space heating less than 25 kWh/m^2.**

What incentive mechanisms have been introduced recently to promote financing of EE/RES projects in Croatia?

UNITED NATIONS

Zagrebačka banka
UniCredit Group

Naslovnica > Građani > Krediti > Stambeni krediti

GRAĐANI
Računi i plaćanja
Štednja i ulaganja
Kartice
Krediti
- Stambeni krediti
- Stambeni krediti u otplati
- Stambeni krediti PSŠ
- Stambeni krediti u projektima stanogradnje AKCIJA
- Gotovinski krediti
- Krediti za motorna vozila
- Studentski krediti
- Lombardni krediti
- Gospodarski krediti

STAMBENI KREDITI

ŽIVIM ZELENO.

POGODNOSTI | SUBVENCIJE I DRŽAVNO JAMSTVO | UVJETI | ZELENI KREDITI

Zeleni krediti

Na dan Planeta zemlje, 22.travnja 2010. Zagrebačka banka predstavila je novi, jedinstveni stambeni kredit na domaćem b
Zeleni krediti.

PRIVREDNA BANKA ZAGREB

GRAĐANI | OBRTNICI | MALI I SREDNJI PODUZETNICI | VELIKE TVRTKE I BANKE | PLATNI PROMET | INVESTICI

GRAĐANI
- KREDITI
  - Nenamjenski
  - Stambeni
  - Lombardni krediti
  - Hipotekarni
  - Potrošački
  - Auto krediti
  - Educa krediti
  - Za plovila
  - Revolving
  - Kontakti
- ŠTEDNJA
- RAČUNI
- KARTIČNO POSLOVANJE (PBZ CARD)
- INTERNETSKO BANKARSTVO
- SEFOVI
- TRAJNI NALOZI
- INOVACIJA
- ZLATNICI I SREBRNJACI

PBZ ENERGO KREDITI

NOVO U PONUDI - PBZ Energo krediti!

Štedite energiju i novac!

Privredna banka Zagreb od početka svibnja u ponudi ima nove stambene kredite pod nazivom PBZ Energo krediti.

PBZ Energo krediti namijenjeni su za financiranje kupnje i izgradnje stambene nekretnine višeg energetskog razreda A, A+ i B, te za poboljšanje energetske učinkovitosti postojećeg objekta.

Za vrijeme trajanja akcijske ponude do 30. rujna 2011. iskoristite akcijsku kamatnu stopu u visini od 4,50% godišnje, fiksno za prve dvije godine otplate kredita, EKS 5,84%, (za klijente Banke), te bez plaćanja naknade za obradu zahtjeva za kredit.
Uz to iskoristite i posebnu pogodnost bez troška procjene/izvida nekretnine u akciji do 30. rujna 2011.

Raiffeisen BANK

Mijenjamo život i poslovanje.

Nabolje!

- stanovništvo
- Flexi tekući račun
- FlexiPLUS tekući račun
- žiro računi
- štednja
- krediti
- stambeni krediti
- FLEXI stambeni krediti-AKCIJA!
- Stambeni krediti uz subvenciju Republike Hrvatske
- **FLEXI GREEN stambeni krediti**
- Projekt 'Prostor za preokret'
- FLEXI stambeni kredit za kupnju stanova u suradnji s Graditeljima
- nenamjenski
- za kupnju motornih vozila

FLEXI GREEN stambeni krediti

uvjeti kreditiranja

	OSNOVNI UVJETI	
Iznos kredita:*	od EUR 5.000,00 do EUR 200.000,00*	
Namjena:	Kupnja, izgradnja, dogradnja, nadogradnja, dovršenje ili rekonstrukcija energetski učinkovitog stambenog objekta, odnosno refinanciranje stambenog kredita odobrenog kao kredita za poticanje energetske učinkovitosti	Adaptacija stambenog objek poboljšanje energetske učinkovitosti kuće ili stan
Kamatna stopa:	• **4,45% fiksna** za prve dvije godine za klijente Banke/klijente u postupku prebacivanja primanja u RBA**	• **4,95% fiksna** za prve dvije godine za klijen Banke/klijente u post prebacivanja primanja RBA**

ERSTE BANK
Jer ste Vi na prvom mjestu.

Erste EKO krediti

Želite živjeti u korak s vremenom, ali ipak razmišljate kako će svijet izgledati sutra. Erste banka spremna Vam je u tome pomoći i zato smo za Vas pripremili **Erste EKO kredite!**

I. STAMBENI EKO KREDITI

Iznos kredita: do 500.000,00 eura u kunskoj protuvrijednosti, uz valutnu klauzulu u eurima
Rok povrata: do 30 godina, uz mogućnost počeka do 12 mjeseci
Naknada: 1% od odobrenog iznosa kredita, min. 250 kn
Namjena: **kupnja kuće ili stana energetskog razreda A+, A i B, izgradnja kuće** s visokom energetskom efikasnošću, refinanciranje predujma i vlastitog učešća u kupoprodajnoj cijeni

MODEL	KAMATNA STOPA	EFEKTIVNA KAMATNA STOPA	IZNOS U EUR	ROK POVRATA	IZNOS ANUITETA U EUR	UKUPAN IZNOS* U EUR	INSTRUMENTI OSIGURANJA
Model I obvezan status klijenta	5,90%	6,43%	od 10.000,00 do 20.000,00	do 13 g.	183,90	28.888,01	hipoteka u omjeru 1:1 ili jamac, garantni polog 5%
Model II obvezan status klijenta		6,16%	od 20.000,01	do 30 g	593,14	214.529,67	hipoteka u omjeru 1:1,2 uz jamca ili policu životnog osiguranja

What needs to be done to make large-scale EE investments a reality? Proposals for next steps

- **Problems for project developers to follow and comply with regulatory changes**
  - Croatia has harmonized energy legislation with EU in the last few years, which caused a rapid legislative development.
  - Expectation: Croatian regulatory framework will be more stable and predictable in future, what is necessary precondition for implementation of large-scale EE investments.
- **The period for obtaining required permits/approvals is too long**
  - Procedures for project development should be simplified.
  - It is also necessary to improve cooperation between different involved institution on national and local level.
- **Consequently, establishment of clear and simple project development procedures and one stop shop for obtaining all necessary permits/approvals will encourage potential domestic and foreign project developers to invest in EE/RES projects.**

What needs to be done to make large-scale EE investments a reality? Proposals for next steps

- **Lack of experience and expertise in preparation of EE/RES projects**
  - Education through thematic EE/RES seminars for project developers, investors, even engineers, architects and decision makers on a national/local level should be extended.
  - Information centres, for technical assistance and financial advice, started to develop on county level.
- **Lack of equity and/or mezzanine financing**
  - Government together with private investors established 5 new private equity funds, which should invest in different kind of projects in Croatia (including EE/RES projects).
- **Public awareness campaigns - in order to increase private and public demand for EE/RES technologies and stimulate the market for these technologies**

THANK YOU FOR YOUR ATTENTION!

Energy Institute **Hrvoje Požar**

Savska cesta 163, Zagreb, Croatia

M: + 385 91 6326 102

T: + 385 1 6326 107

F: + 385 1 6040 599

zjuric@eihp.hr

www.eihp.hr