



# Can renewable energy sources reduce gas and electricity consumption through green jobs? Reality or utopia?

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## Countries of environmentally friendly Europe 2020 (20-20-20)

**Climate and energy aims for 2030 with respect to competitive, safe and low-carbon EU economy**

**The Commission has established the following major components of political framework for 2030:**

1. binding target to reduce greenhouse gas emissions – by at least 40%
2. binding target of renewable energy throughout the entire EU - in the transition to competitive, safe and sustainable energy system of at least 27%
3. energy efficiency - to improve energy efficiency by at least 27%
4. reform of the European emissions trading system
5. competitive, affordable and safe energy - diversification of supply and relying on domestic energy sources.



European Commission  
(political and main  
executive body of the EU)

The Commission  
proposes numerous  
guidelines and  
implementing regulations.

In 2010 and 2011,  
70% of newly  
constructed power  
plants in the  
European Union were  
from renewable  
energy sources.



In the core of the Sun, 4,300,000,000 kg of hydrogen are converted into helium each second.

The energy transmitted by sunlight enables almost all life on Earth, thanks to photosynthesis, at the same time enabling weather and climate on Earth.



**In only one second, the Sun emits more energy than our civilization has consumed during its entire history and development**

**In 10 billion years, the Sun mass reduces by only one thousandth part (SUN - inexhaustible, clean and reliable energy source)**

Natural potential of  
Solar radiation is 50  
times higher than the  
sum of all reserves of  
fossil and nuclear  
fuels

Technical potential of  
Solar radiation energy  
is still higher than total  
world energy  
consumption



## Power capacities (new and decommissioned) in EU-27 in 2012 (MW)



At the end of 2013

138.9 GW

(160 TWh of electricity  
for 45 million of EU  
citizens)

Leader Europe with 81.5  
GW (encompassing

around 59%  
of total installed  
systems in the world)

China 11.8 GW

Europe 11 GW

USA 5.4 GW

Japan 6.9 GW

Australia 2.4 GW

India 1.2 GW

Total power of installed photovoltaic systems in the world at  
the end of 2013

Power MW



## Development of total installed capacity of PV systems from 2000 to 2013

Total of 38.4 GW  
of PV systems were installed in the world in 2013, of  
which 11 GW or 29 % in Europe  
In Germany total of 35.7 GW  
This is 26% of PV systems installed in the world, or  
44% of installed PV systems in Europe.





Flat-plate collectors  
installed vertically  
Jankomir-Zagreb

The possibility of installation and solar  
contribution depending on the position  
of solar collectors

Flat-plate collectors on  
concrete panel,  
Kanfanar-Rovinj

Flat-plate collectors  
installed  
horizontally, Karlovac



## Photovoltaic systems integrated into facades



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## Photovoltaic power plants 1– 50 MW



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Pisarovina, 10 kW

Špansko, ZG 10 kW

Samobor, 10 kW

Sesvete, ZG 10 kW

Posedarje, Zadar 10 kW







## Croatia: 1 July 2007

Ordinance on the use of renewable energy sources and cogeneration (Official Gazette, no. 67/07 and no. 88/12)

Ordinance on acquiring the status of eligible electricity producer (Official Gazette, no. 67/07, 35/11, 88/12 and 132/13)

Tariff system for the production of electricity from renewable energy sources and cogeneration (Official Gazette, no. 33/07, 63/12, 121/12, 144/12, 133/13, 151/13 and 20/14)

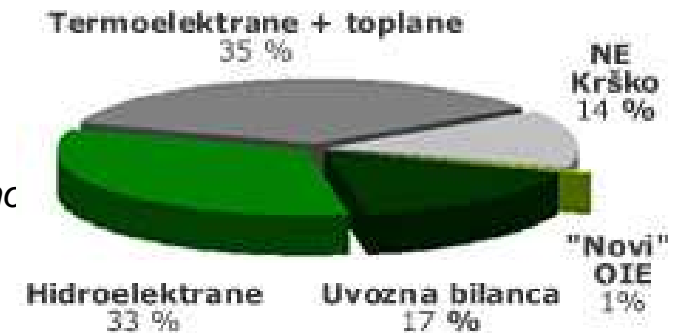
Regulation on incentive fees for promoting electricity production from renewable energy sources and cogeneration (Official Gazette, no. 33/07, 133/07, 155/08, 155/09, 08/11, 144/11 and 128/13)

### 07.01.11. Amendment to the Regulation (HRK 0.005/kWh)

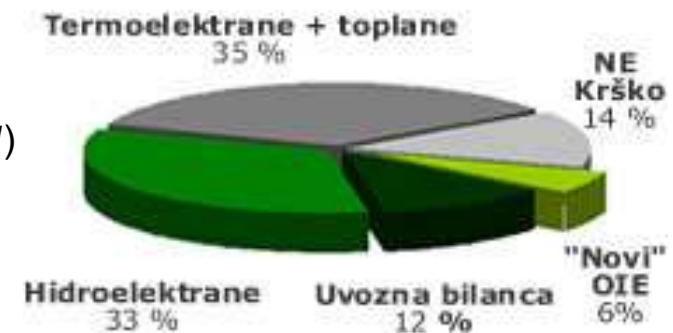
Regulation on the minimum share of electricity produced from renewable energy sources and cogeneration whose production is incentivised (Official Gazette, no. 33/07 and 8/11)

### 07.01.11. Amendment to the Regulation (13.6% until 2020)

2006.



2010.



### Actual facts:

1. Are citizens of the City of Zagreb interested in the installation of integrated solar power plants, especially smaller ones, with power up to 10 kW?
2. Do we already have designers, installers and companies producing photovoltaic modules?
3. Isn't the society of wealthy citizens who pay large amounts for energy and will pay even more with the accession of Croatia to the European Union the concern of the Republic of Croatia?
4. Why wouldn't some of that money stay in the family, city, county and finally in Croatia, for better life and better standard of all citizens? This would be an addition to pensions, salaries, scholarships, social welfare etc.



## 2008 SOLARISATION OF THE REPUBLIC OF

### “Project 4E SH” CROATIA

#### DIRECTION TOWARDS GREEN ETHICS, ECOLOGY, ENERGY AND ECONOMY

- Croatia in the next ten years, 1m<sup>2</sup>/citizen. STK

2020 around 4500000 m<sup>2</sup> (3150 MW<sub>t</sub>) 1.E

Around 2500 GWh annually (1 million tons of CO<sub>2</sub>) 2.E

- Then 1 m<sup>2</sup> FN modules/citizen approx. 4500000 m<sup>2</sup>

which corresponds to the power of 500 MW

aim in 10 years 1000 MW (100 thousand roofs)

, which is around 1200 GWh electricity/year (6.3% of  
consumption), This is around 720000 tons less of CO<sub>2</sub>  
(11 million €).

Solarisation of Croatia = 30000 new jobs 3.E

Ethics and moral towards everything created on Earth

4.E



## Solar roof Špansko-Zagreb

### Equipment

- solar collectors 10 m<sup>2</sup>
- hot storage tank 750 l
- rainwater tank 8 000 l
- solar module and 7.14

kW<sub>p</sub>

- 14 x 175      9.59 kW

- 20 cm of mineral wool

### Savings:

- thermal energy 80%
- electricity 25% more
- water 55%
- annual reduction

CO<sub>2</sub> approx. 10,500 kg



**Solar roof Špansko-Zagreb (10 kW)**  
**Solar tower Špansko-Zagreb (7.28 kW)**  
**Solar thermal system 10 m<sup>2</sup>**  
**Object insulation 20 cm**



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