

REALISE FORUM

Maribor, 11.05.2006



Slovenian Small Hydropower Association

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member



Small Hydro:

Early Birds on the Electricity Market

10 Facts



1. **HPP's are producing 1/5 of world's electricity.**
2. **The first HPP in Europe was HPP Jaruga (1895; 2 MW) on Krka falls near Šibenik. It supplied 320 street lamps in 11 km remote city.**
3. **The biggest HPP is Itaipu (Brazil & Paraguay) with installed power 12.600 MW, hundreds of run-of river SHP in developing countries has the power around 5 kW – 2,5 million times smaller!**
4. **Before II. WW there were over 6.000 mills and sawmills in Slovenia.**
5. **SHP are mostly run-of river with minimal environmental impact.**
6. **Among RES only HPP's can store huge amounts of energy on account of water basins.**
7. **Only HPP's can produce 200x more energy than needed for construction and operation. This is 10x more than gas-fired thermal PP.**
8. **SHP's duration period is over 100 years!**
9. **SLO has 27.000 km of rivers, so SHP are producing 11.100 kWh of electricity by each km. Over SHP's each river's km is therefore producing electricity for annual consumption of 3 households.**
10. **Modern HPP's are able to convert over 90 % of water energy to electricity. This efficiency is the biggest amongst all forms of electricity production.**

Numbers

	EU-15	EU-10
Number of SHP's	14.488	2.770
Installed Power (MW)	10.000	820
Electricity Production (GWh/y)	35.000	2.300
Production costs €cent/kWh	5-15	2,4-3,2
Investment costs €/kW	1.200-3.500	1.200-2.200
Average installed power (kW)	700	300
Potential for new SHP's (GWh/y)	19.600	4.000

**SHP's are employing 10.000 people in EU,
RES sector indirectly employs over 300.000 !**

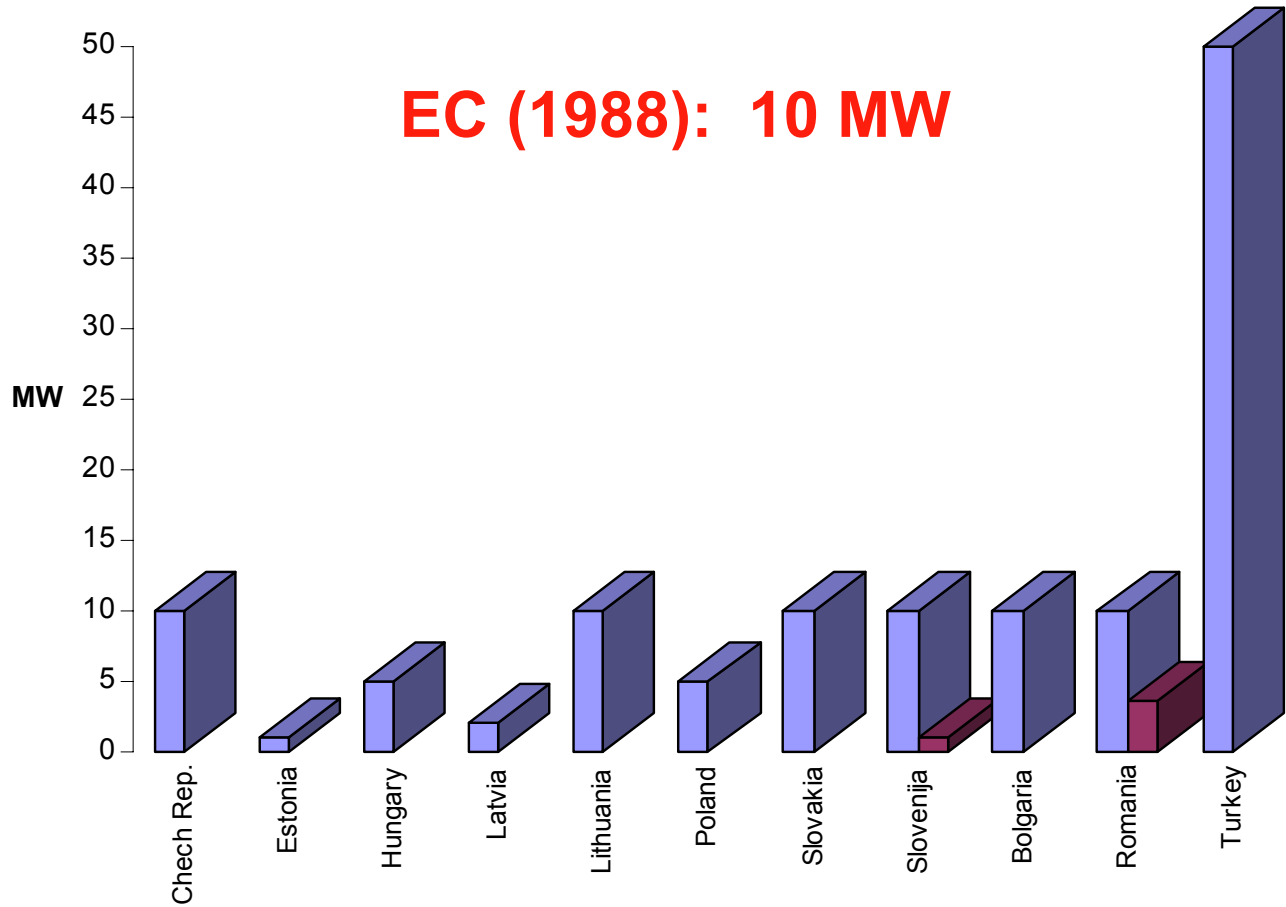
RES industry annual turnover: 15 billion € +



Definition of SHP



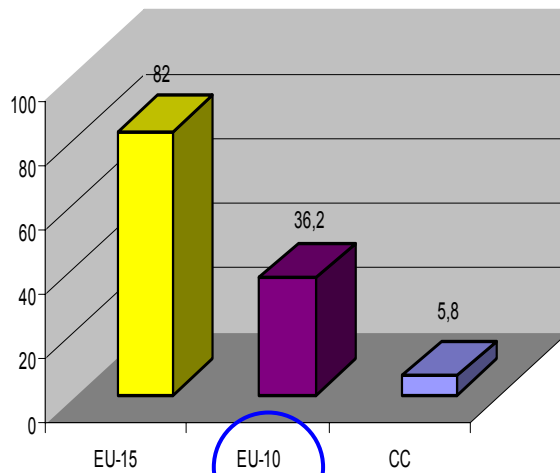
© Photo: iStock



Exploited potential & SHP's by age

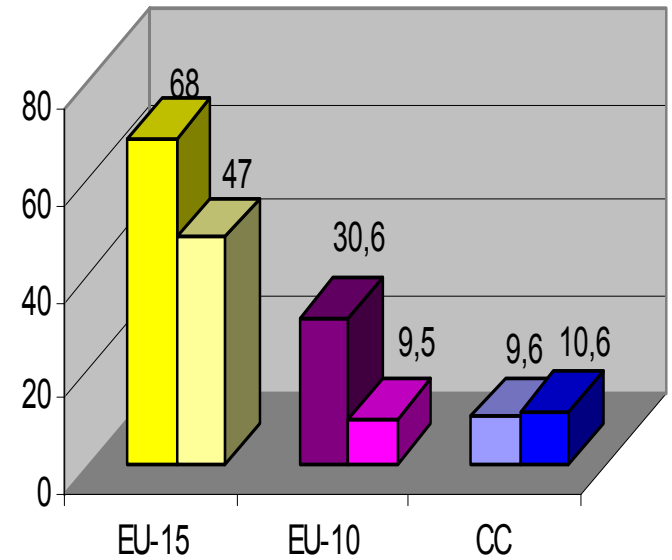


Percentage of economically exploitable potential, exploited to day



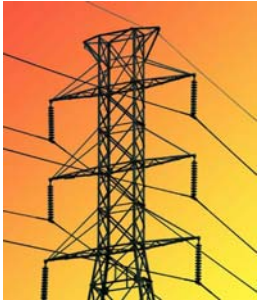
only 36 %!

SHP's age in %

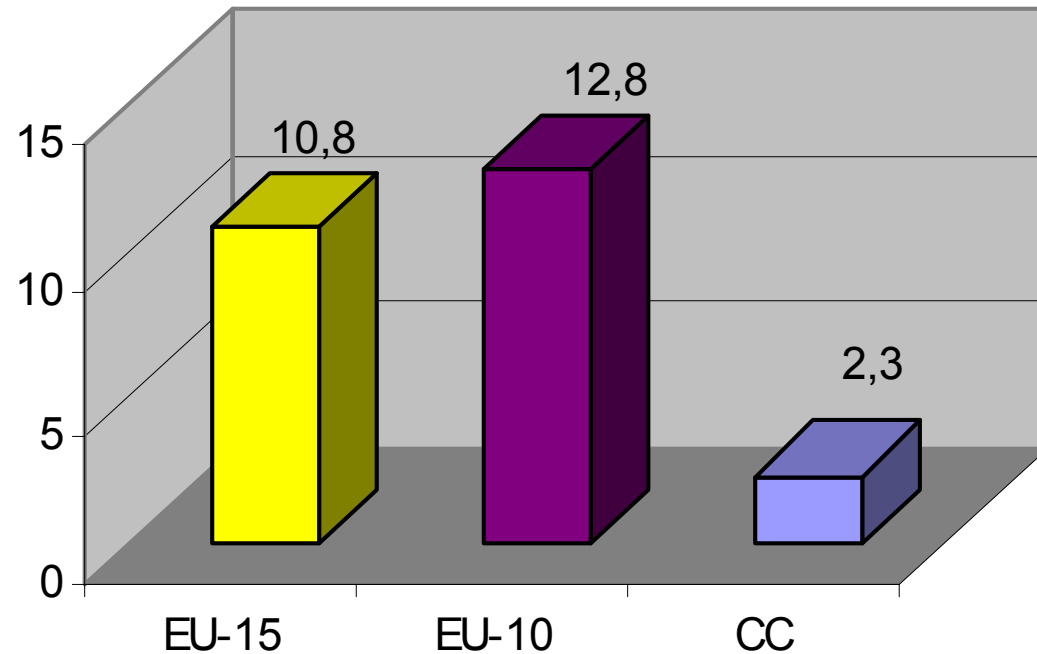


1. coloumn: 40-59 years
2. coloumn: >60 years

SHP's contribution



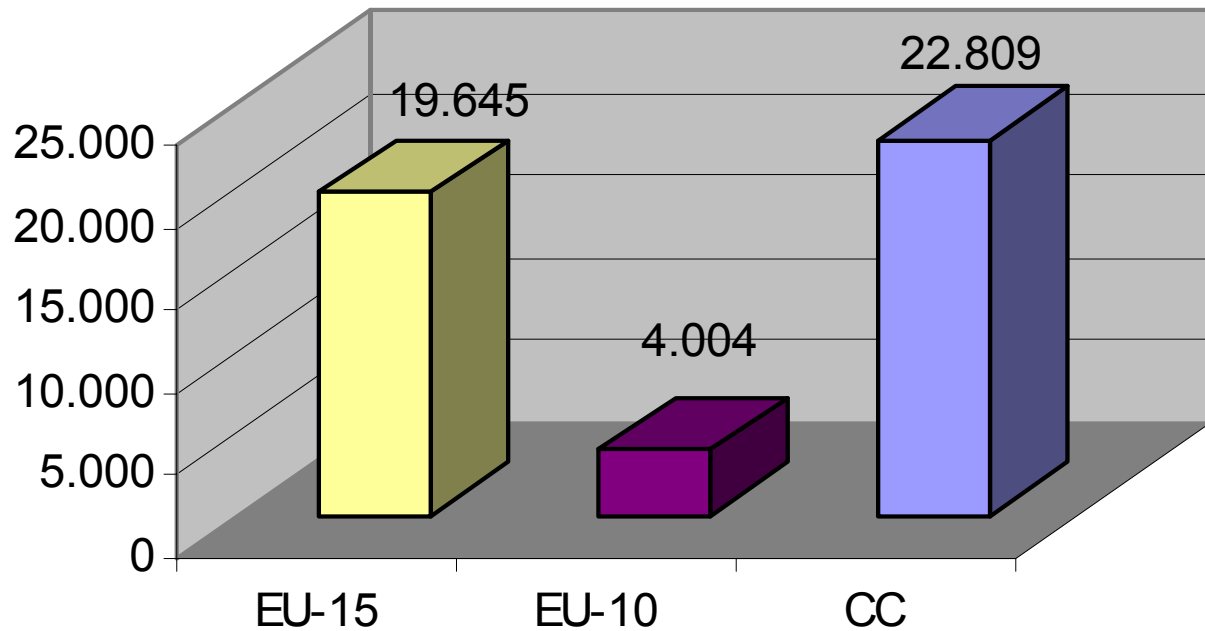
SHP's contribution to total HPP's production



SLO has 27.000 km rivers, so SHP are producing 11.100 kWh of el.en. by each km. Over SHP's each river's km is therefore producing electricity for annual consumption of 3 households.

Potential

**Remaining potential for SHP's in GWh/y
(without increasing power of existing SHP's)**



Countries decisions for SHP's exploitation (increase to 2015):

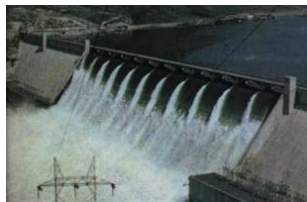
EU-15: 30 %

EU-10: 49 %

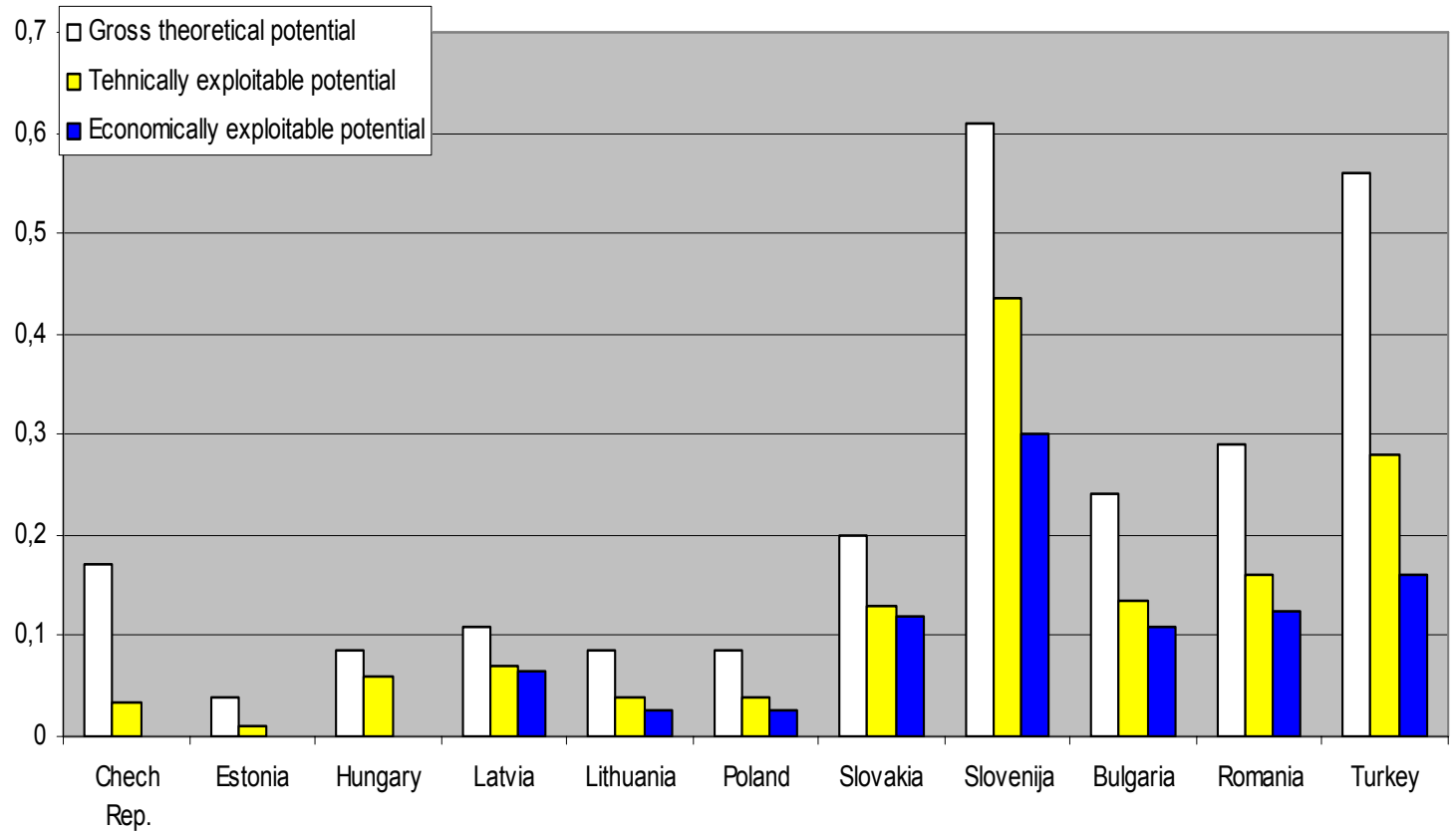
CC: 72 %



Potential



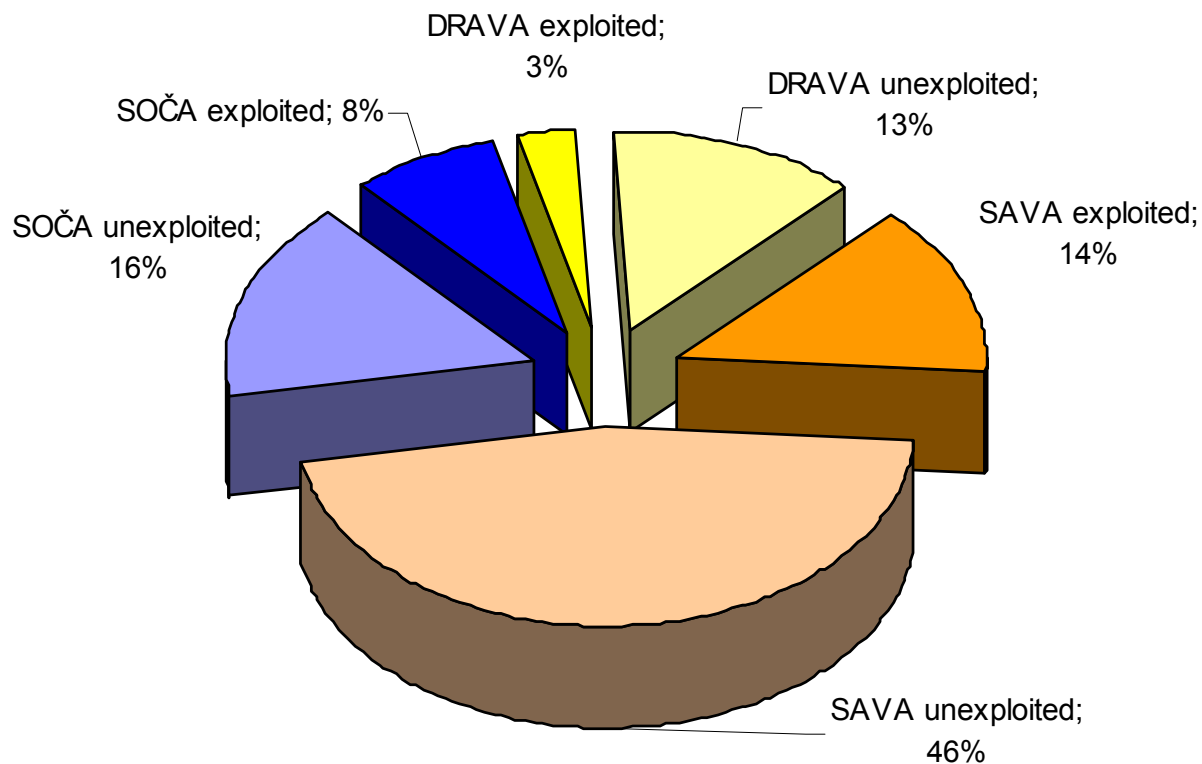
Specific energy GWh/y/km²



SHP's Potential in Slovenia



SHP: exploited/unexploited (%)



Source: EIMV

Thematic Network Of Small Hydropower

Under FP5
with DG TREN's support

September 2004

Litvanian SHP Association

ESHA

European Small Hydropower Association

IT Power

Renewable Energy Consultants, UK

ADEME

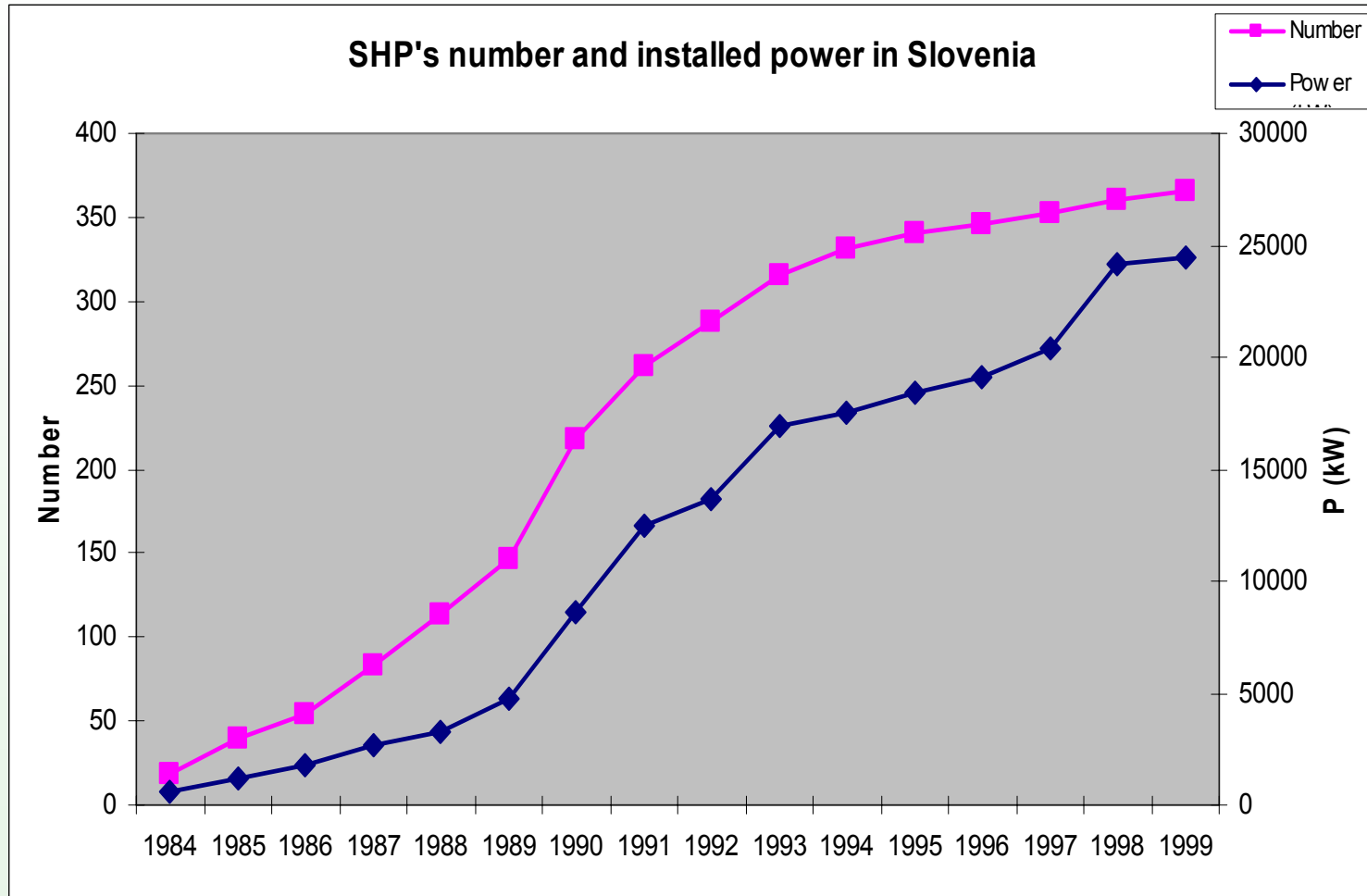
Agence de l'Environnement et de la Maitrise de l'Energie, France



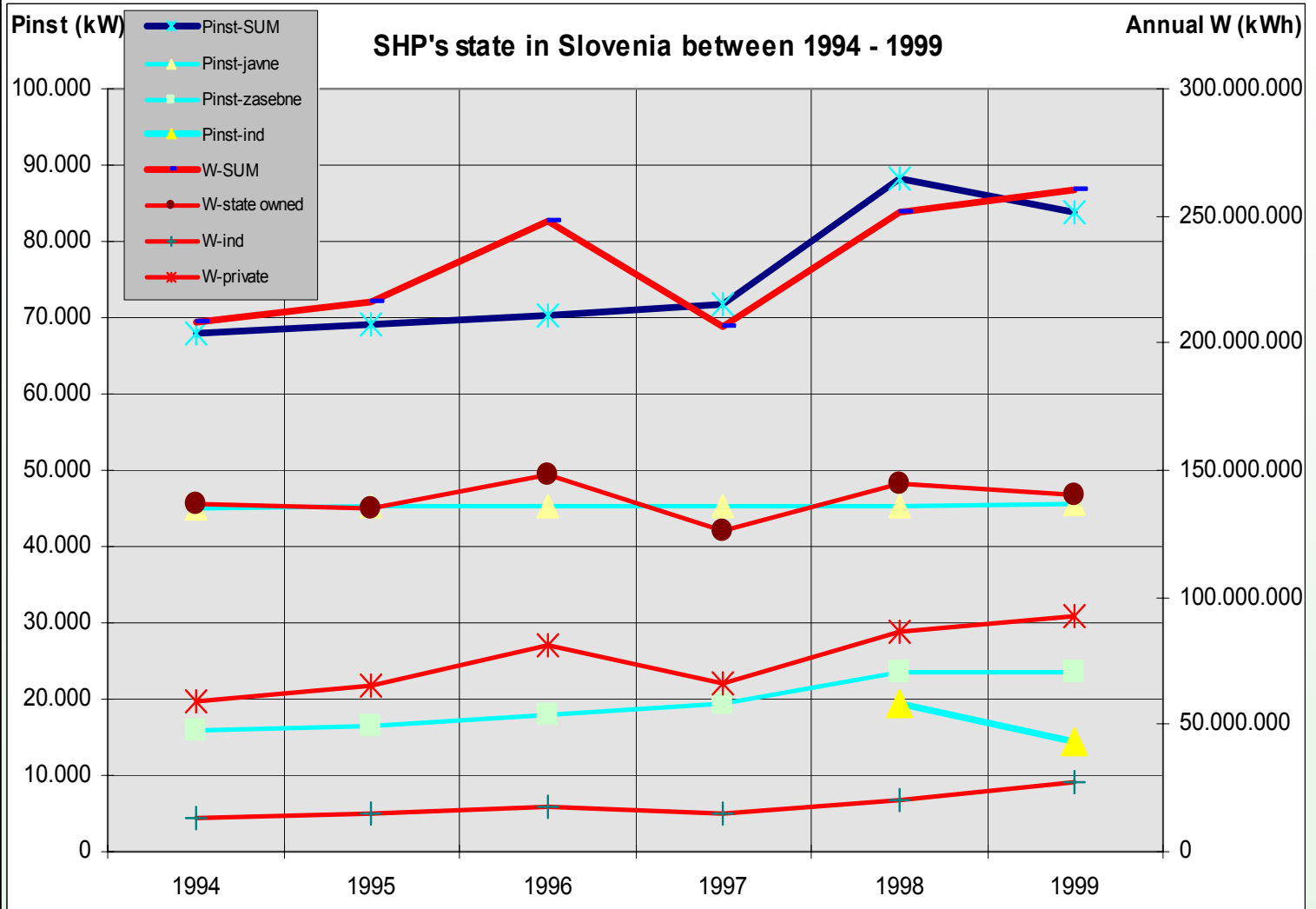
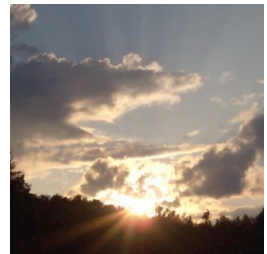


		HPP's installed power in 2002		Production (on grid!)	
Ownership/Distribution		MW	No.	GWh	
State owned	Dravske	576,500	8	2314,99	
	Savske	130,955	4	288,45	
	Soške	172,200	24	406,78	
	Elektro Gorenjska	11,317	15	51,35	
	Elektro Ljubljana	3,603	10	11,46	
	Elektro Maribor	2,670	6	7,23	
	Elektro Celje	1,276	5	3,22	
	SUM Distribution	18,866	36	73,26	
	SUM state owned SHP	44,666	57	111,55	
SUM with big HPP's		898,521	72	3083,48	
Private	Private	Elektro Celje	4,59	55	93,1
		Elektro Primorska	4,25	72	
		Elektro Gorenjska	12,35	82	
		Elektro Ljubljana	1,98	66	
		Elektro Maribor	2,85	30	
	Auto-producers	Elektro Celje	4,78	6	87,99
		Elektro Primorska	0,00	0	
		Elektro Gorenjska	3,06	9	
		Elektro Ljubljana	4,89	21	
		Elektro Maribor	1,15	1	
SUM Private SHP's		39,90	342	181,09	
SUM	SUM all SHP's		84,56	399	292,64
	SUM all HPP's		964,22	435	3302,86

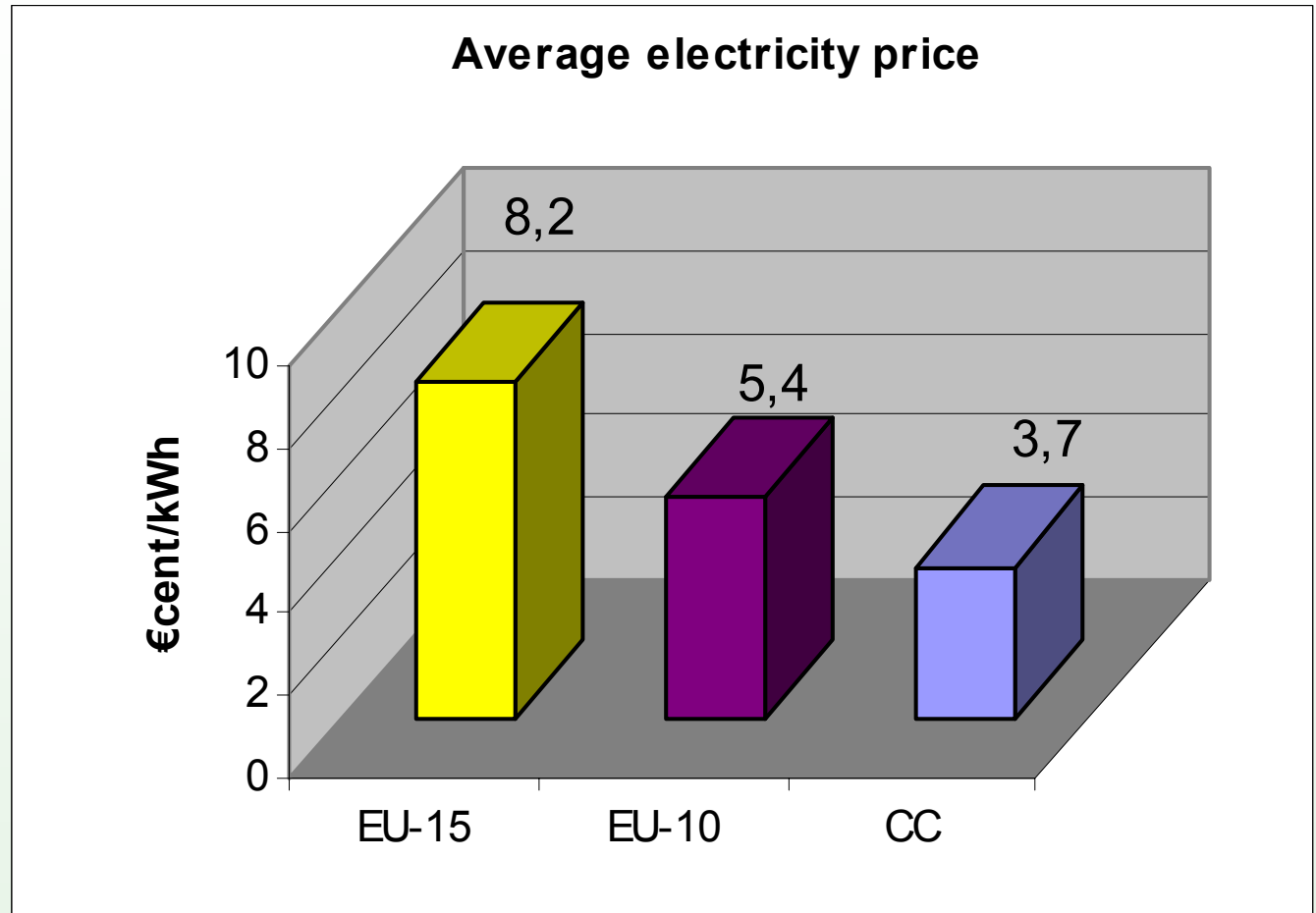
Effects of Support



Support Abolition



SHP's electricity prices



SLO: 5,6 €cent/kWh

Environmental importance

NEP 2004:

Energy brutto potential of Slovenian rivers

19.400 GWh/y

Technically available potential

9.100 GWh/y

Economically available potential between

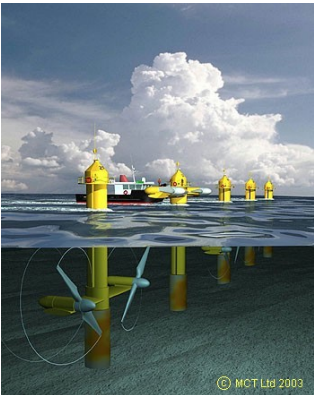
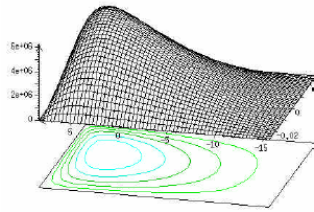
7.000 - 8.500 GWh/y

Currently exploiting

3.970 GWh/y or 50%

Of Economically available potential

MHE: 180 MW, 700 GWh = 576.000 t CO₂



Space invaders?

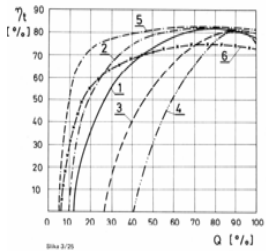
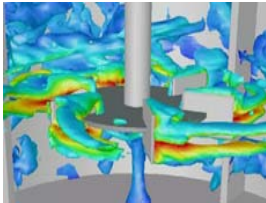
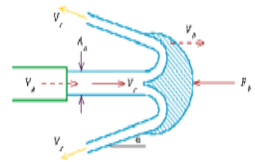
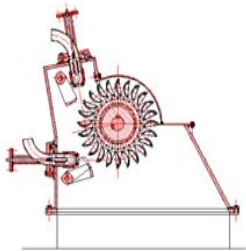
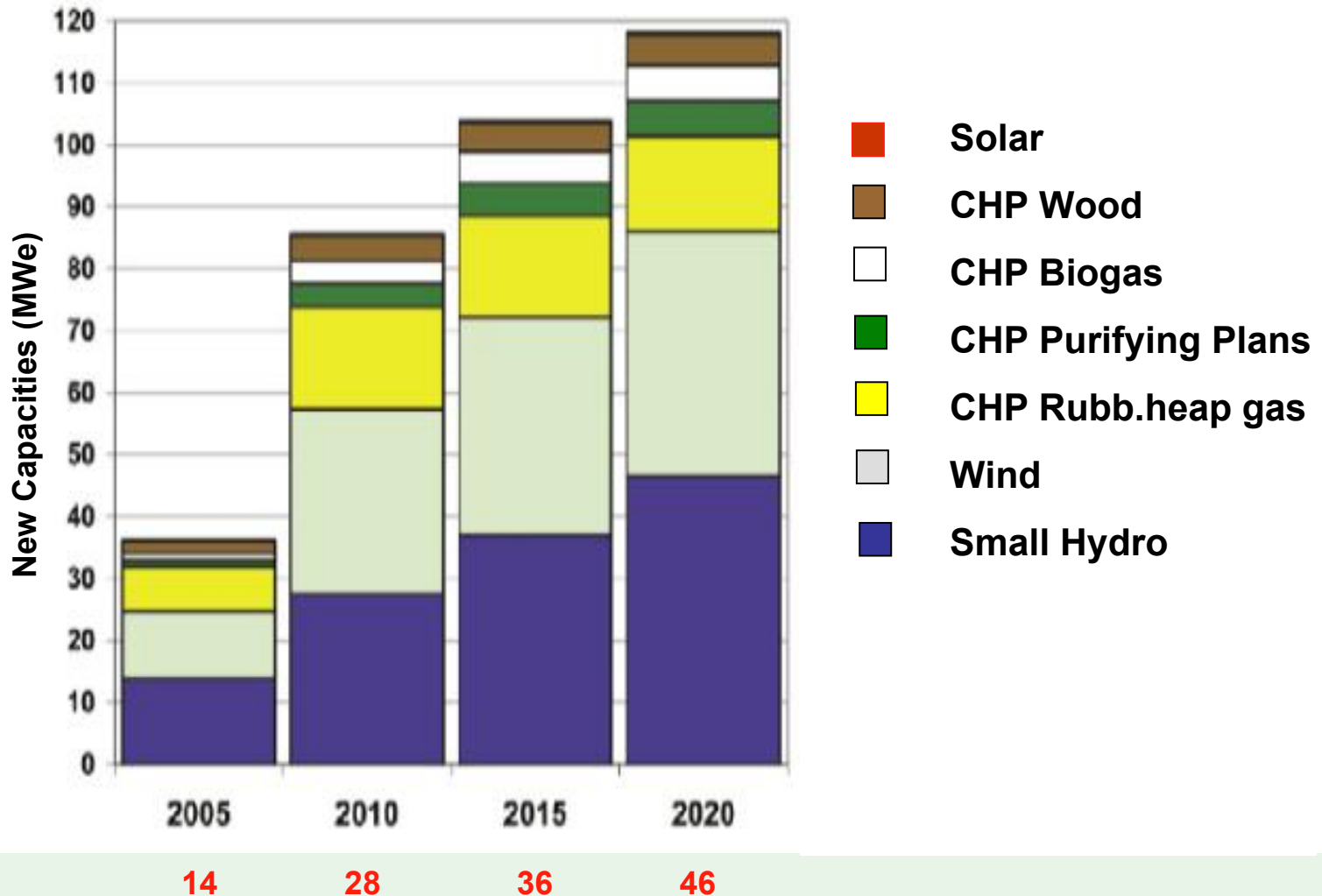


Bild 3-75

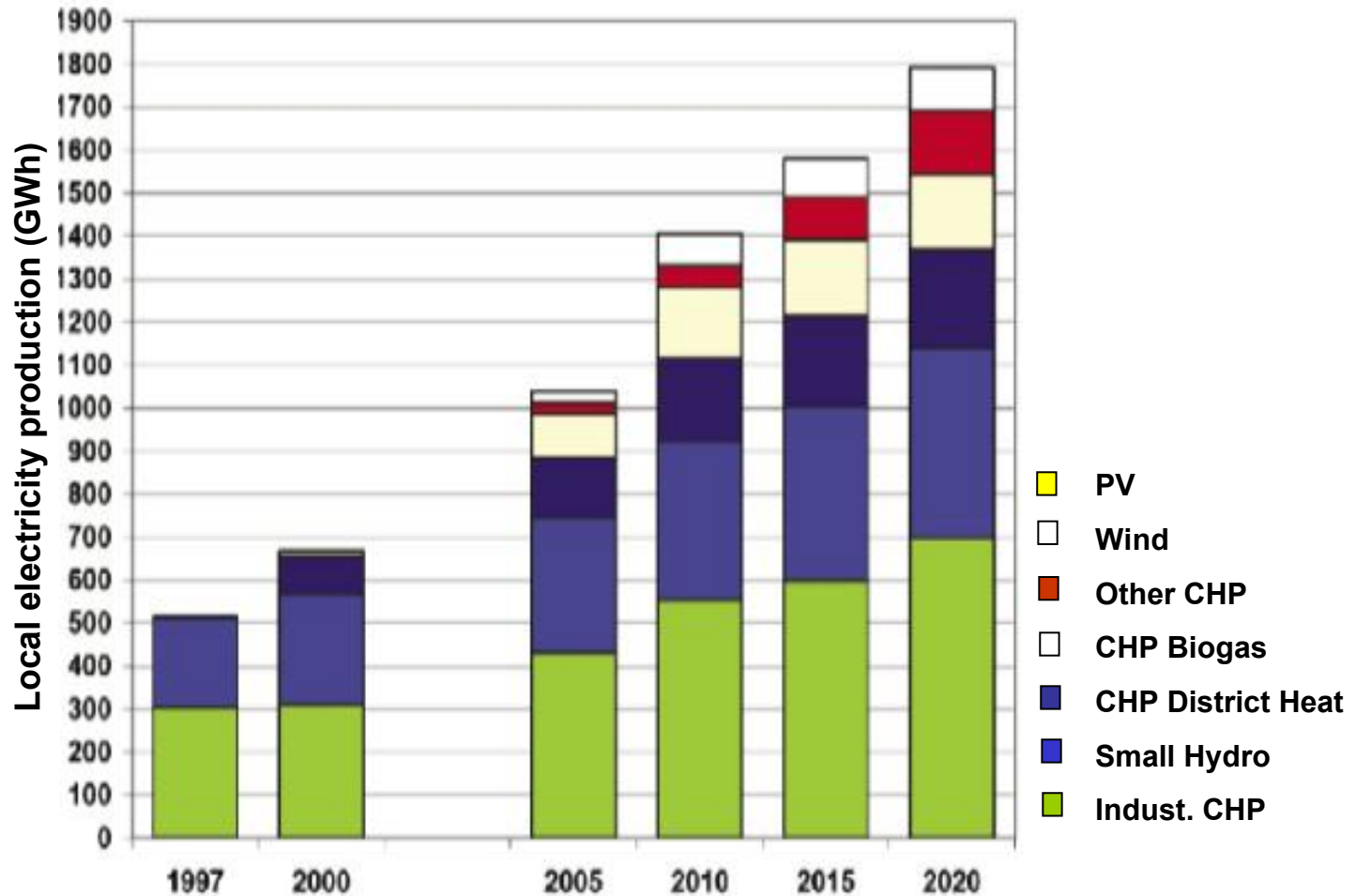
- Ubravniški turbinje v odvisnosti od pretoka
1. Turbinna turbinja s projekcijsko turbinjo z regulirano kraljico
 2. Turbinna turbinja s projekcijsko turbinjo z regulirano kraljico
 3. Turbinna turbinja s projekcijsko turbinjo z regulirano kraljico
 4. Turbinna turbinja s projekcijsko turbinjo z regulirano kraljico
 5. Turbinna turbinja



New capacities in MW



Production in GWh



200

250

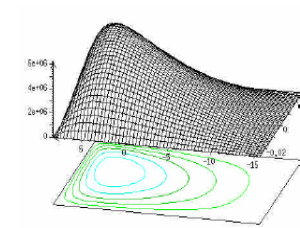
300

350

400

430

Source: NEP 2004



Tomorrow?

Price

Annual adjustment? That's the law!

Concession procedure

Unclear, Too long

WFD (Water Framework Directive)

Danger around the corner!

Incentives:

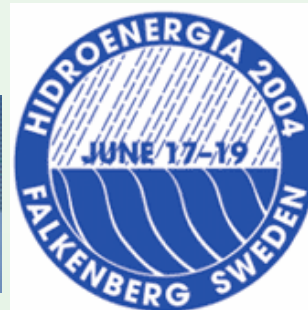
tax, subsidy ➤ budget (800 M vs. 14.000 M)

Declaration of Edinburg 2005

MEP common statement – “Strenghtening EU strategy for RES & EE!” (REEES)

Target = 100% RES by 2070

First step: mandatory target 25 % RES (33 % RES-E) by 2020 !



Burden of Proof



It's not easy being green...

Promote the product, not the powerplant!

RES Pooling & Organizing

2-Way responsibility

Firm Policy, Long-term stability,
Synergical Support System

“QP will have to carry bigger responsibility for market development, then defined by their position between power sources!”



Thank you for your attention!



Slovenian Small Hydropower Association

