



SMALL HYDROPOWER WORKSHOP
Lausanne, 30th June – 1st July 2005



Small Hydropower situation in New Member States and Candidate countries

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OVERVIEW

- ❖ Background
- ❖ **Small Hydropower at first glance:**
EU -15, EU -10, Accession Countries
- ❖ Individual countries: **EU -10** and **Candidate Countries**
- ❖ Conclusions

REPORT

“Small Hydropower (SHP) situation in Accession countries”

September 2004

Marketing work group:

**ADEME, IT Power, ESHA and Lithuanian Hydropower
Association**



EU –15: 15 Members of the EU before enlargement in May 2004

EU –10: 10 New Member States

Candidate (Accession): 3 Candidate Countries to the EU membership

Activities covered in the project were:

- ❖ Compilation of a database of key Small Hydropower (SHP) statistics and information in the New EU Member States and Candidate countries**
- ❖ Analysis of SHP statistics, existing potential for SHP, technical and environmental aspects, water and energy industries and service capability**

❖ A review of institutional, economic and regulatory issues of the legislation in force relating to SHP,

❖ Forecasting of SHP installed capacities & electricity generation, identification of the preliminary targets of SHP contribution in implementing the EU RES-E Directive,

❖ Comparison of the SHP sectors both in EU-15 and EU-10 and CC

❖ Survey of SHP situation:

8 new EU countries (except Cyprus and Malta) + 3 Candidate countries + Croatia (episodically). Reference year: 2002/2003

❖ BlueAGE (Blue Energy for a Green Europe) study **(ESHA, SERO, IEFE, 2001)**

❖ ESHA data base

❖ International Journal on Hydropower & Dams (2004) , World Energy Council (2004) , EBRD (Black and Veatch, (2002), IEA (2003) , EREC (2003), Eurostat (2004), WWF (2004)

Information sources of the study

Small Hydropower at first glance:

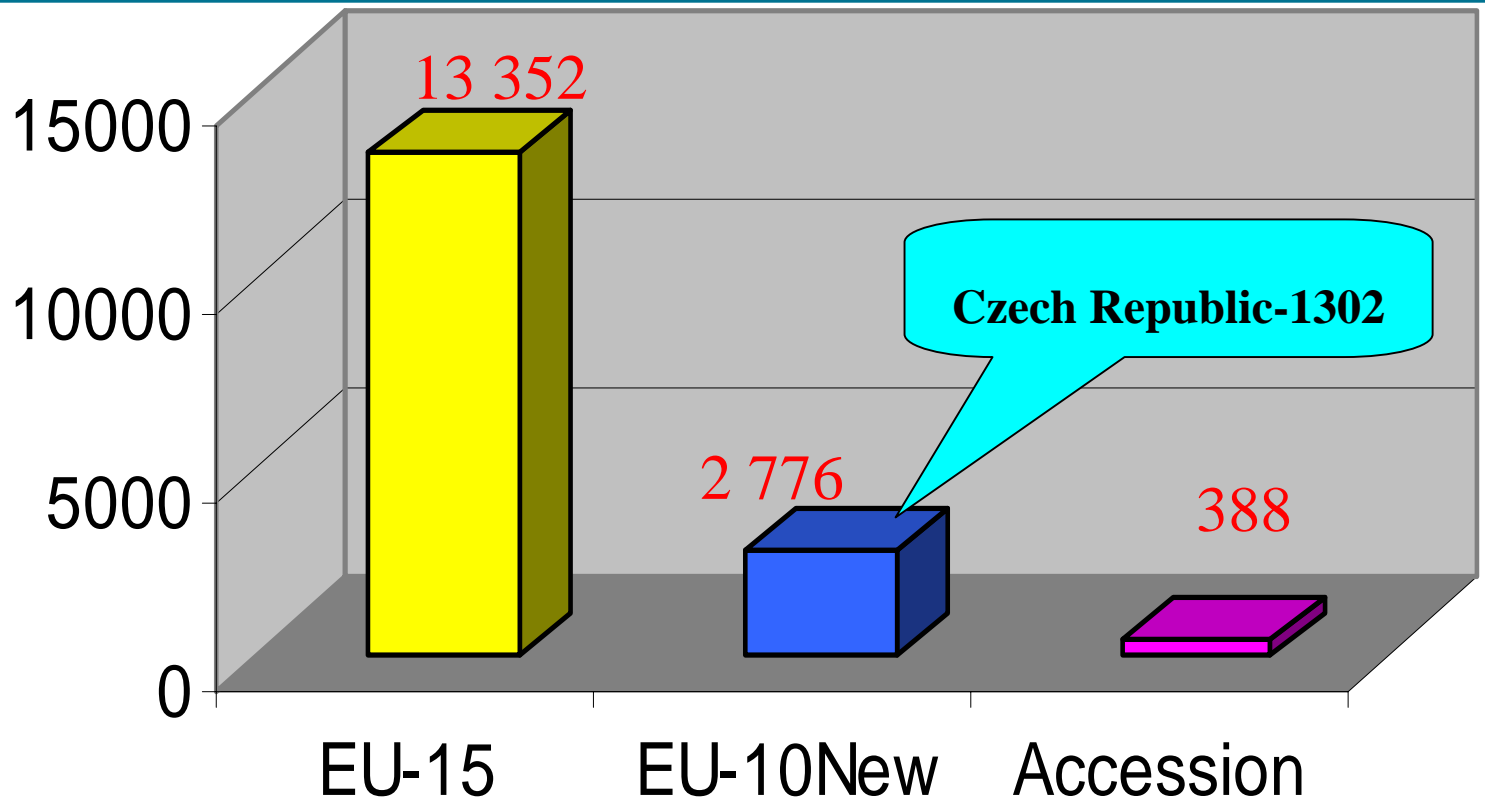
EU -15,

EU -10,

Accession (Candidate) Countries -CC

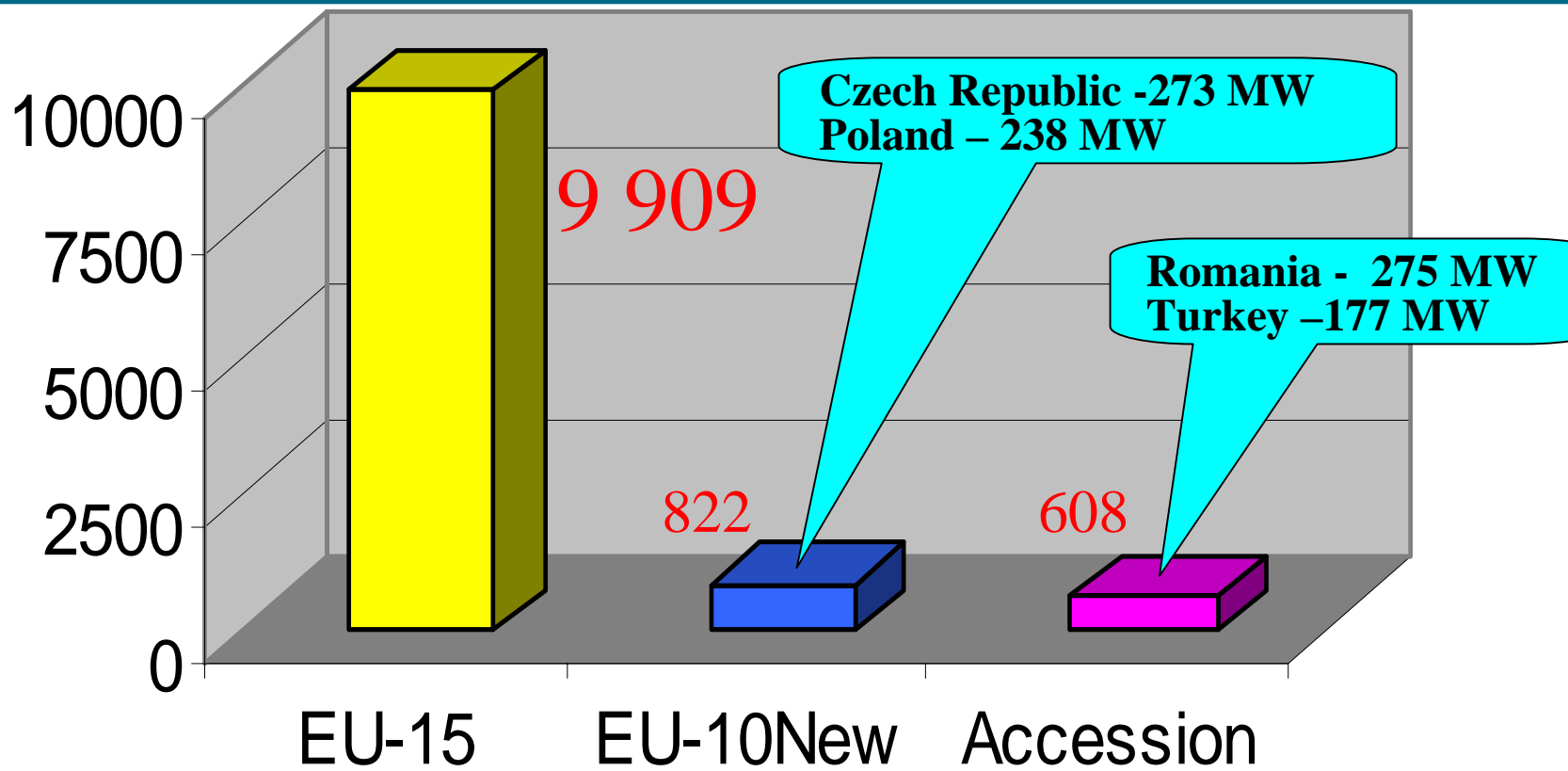
SHP plants (<10 MW) in operation

Number of SHP



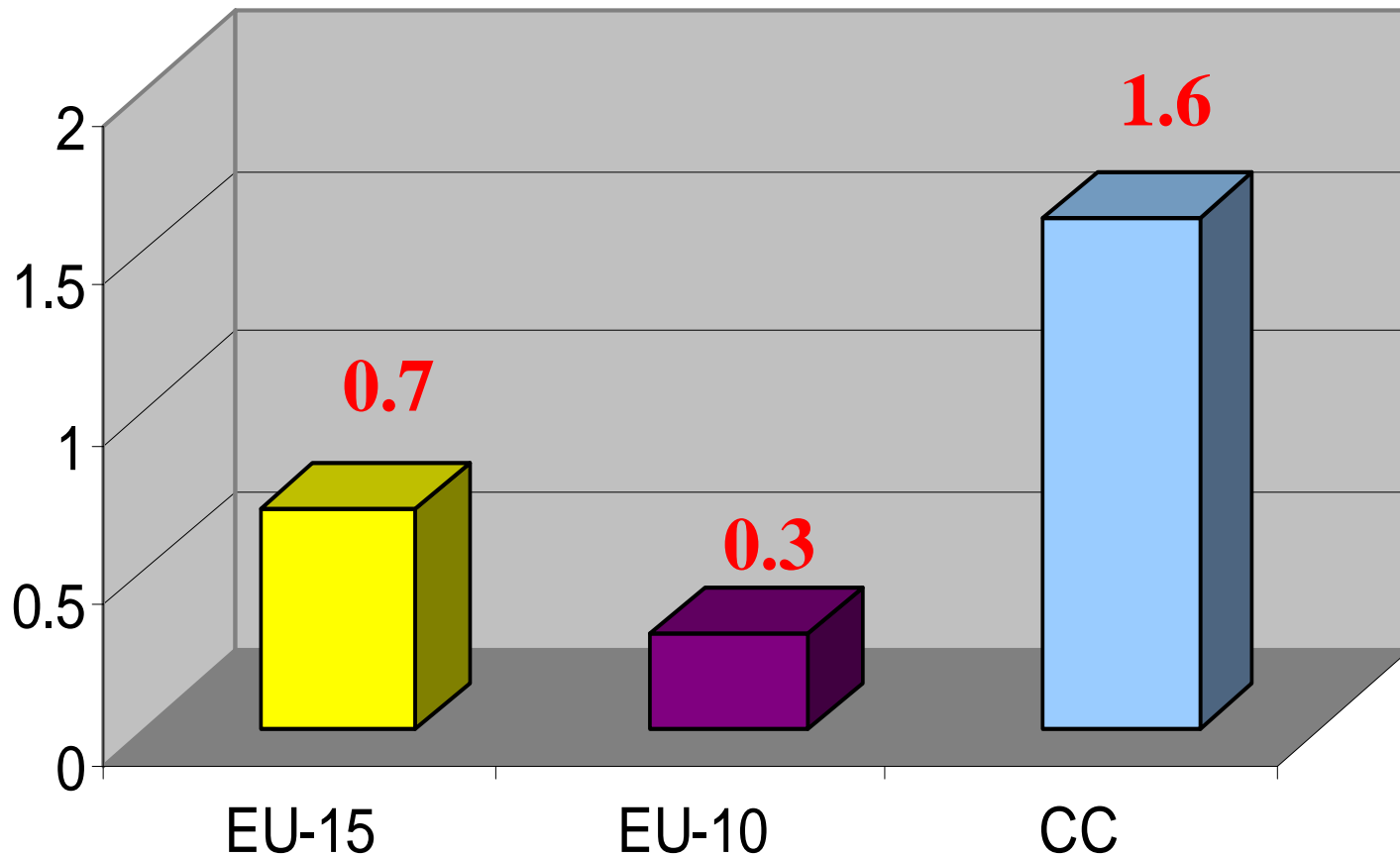
Number of Small Hydropower Plants

SHP Installed Capacity MW



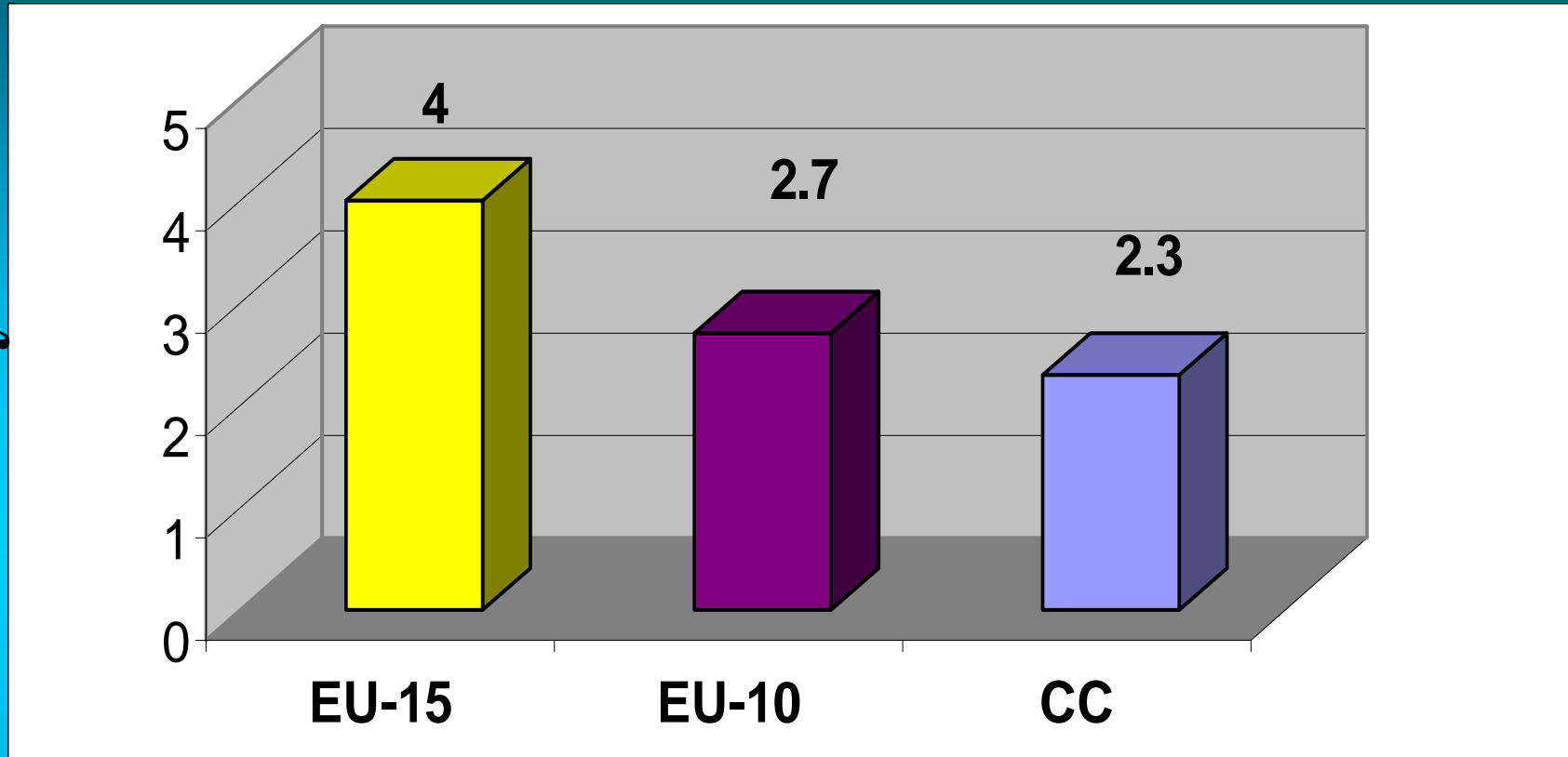
SHP Installed Capacity

SHP plant size MW



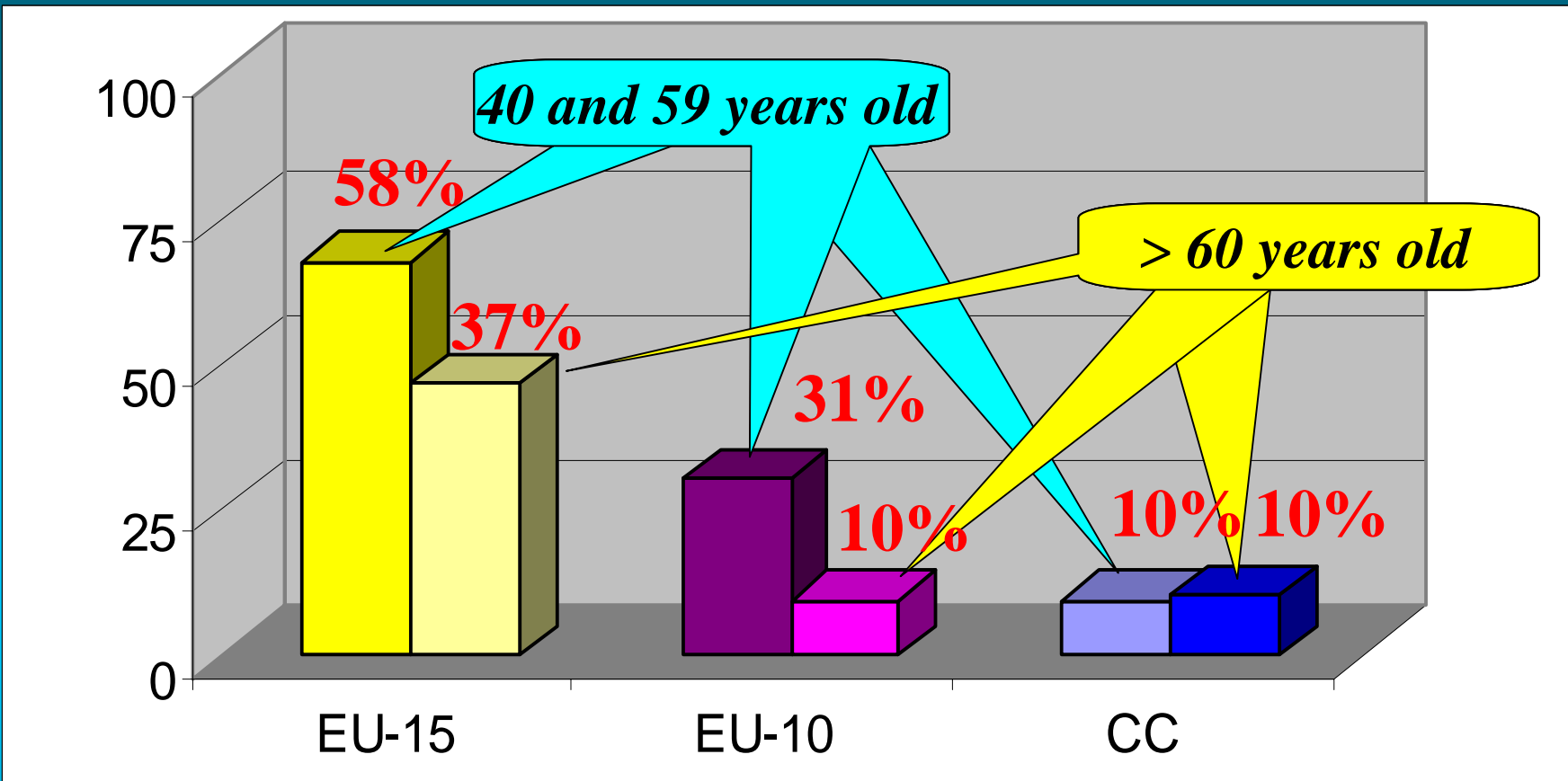
Average SHP plant size

**Electricity generation
GWh/year**



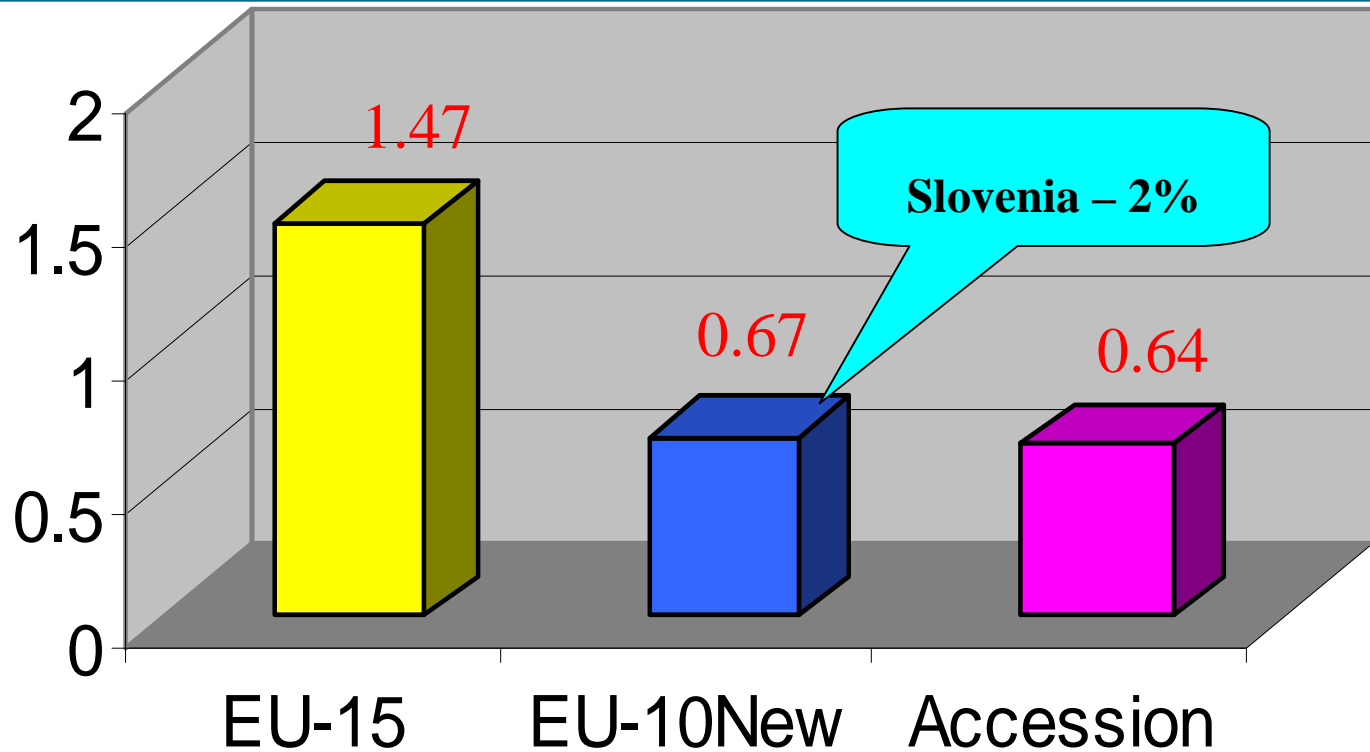
**A SHP plant of installed capacity of 1 MW
producesGWh/year**

Percentage of SHP age %



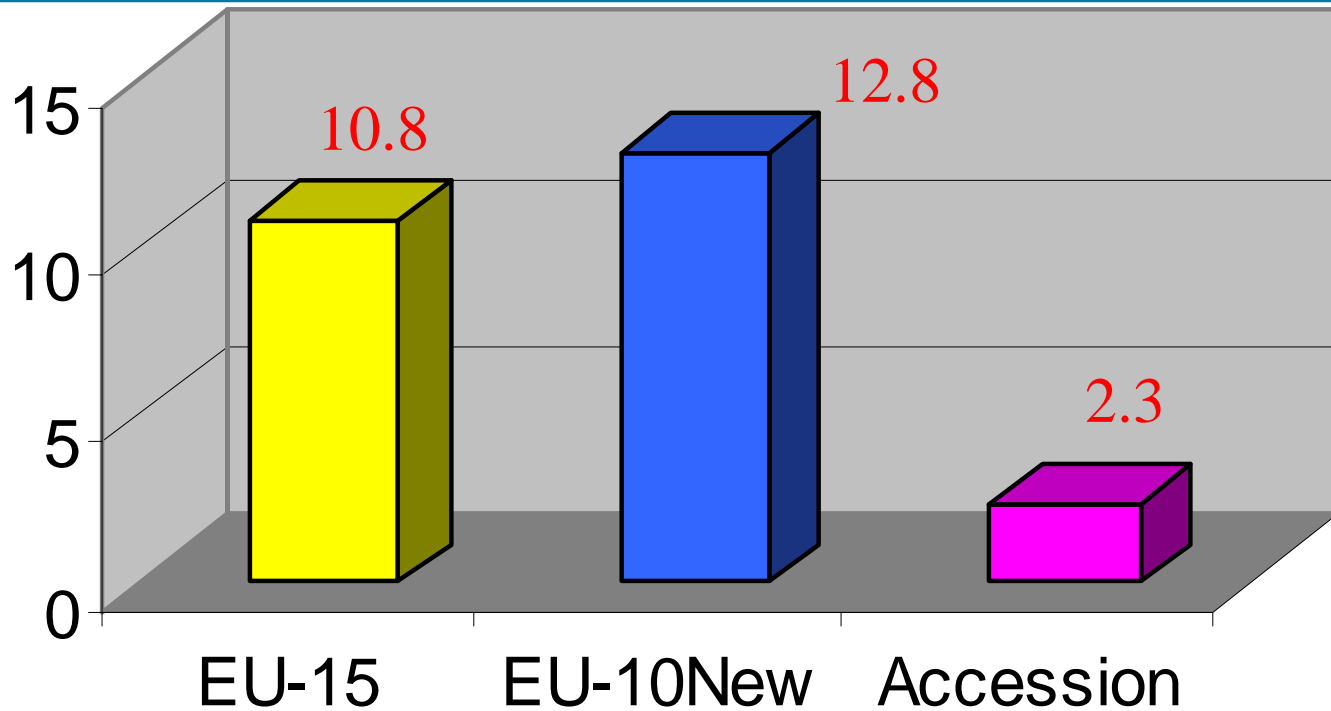
SHP age distribution

SHP contribution %



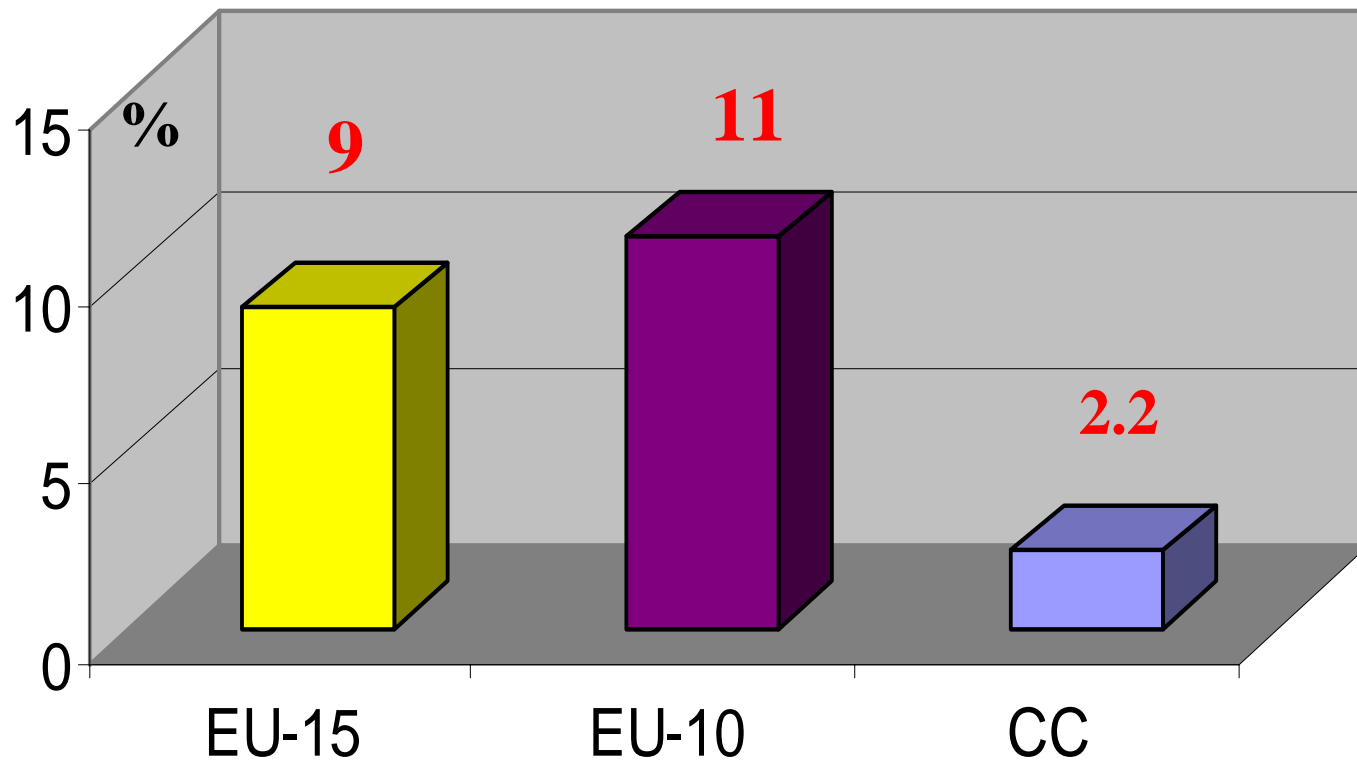
SHP Contribution to total electricity generation

SHP contribution %



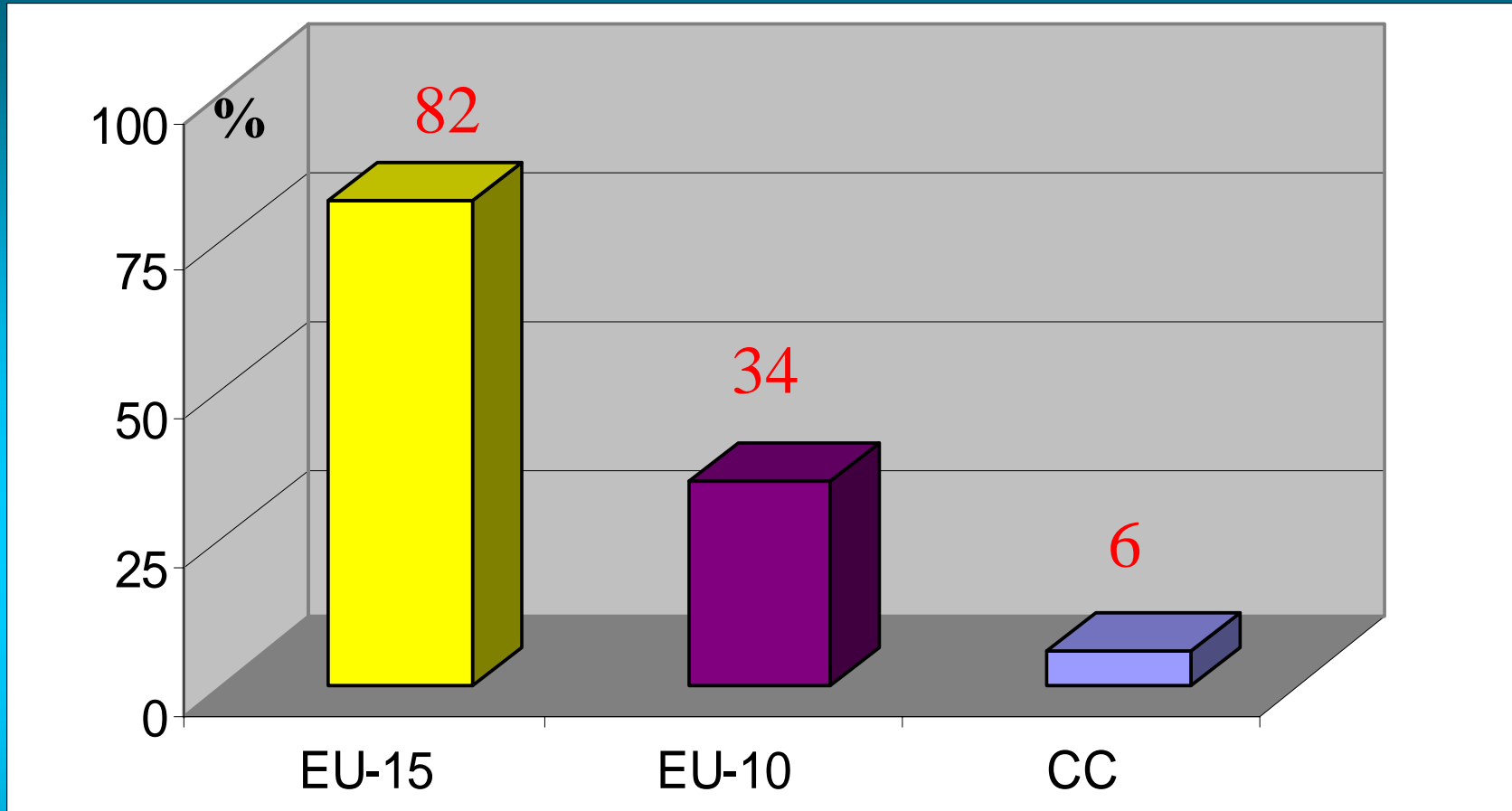
SHP Contribution to total Hydropower electricity generation

SHP contribution %



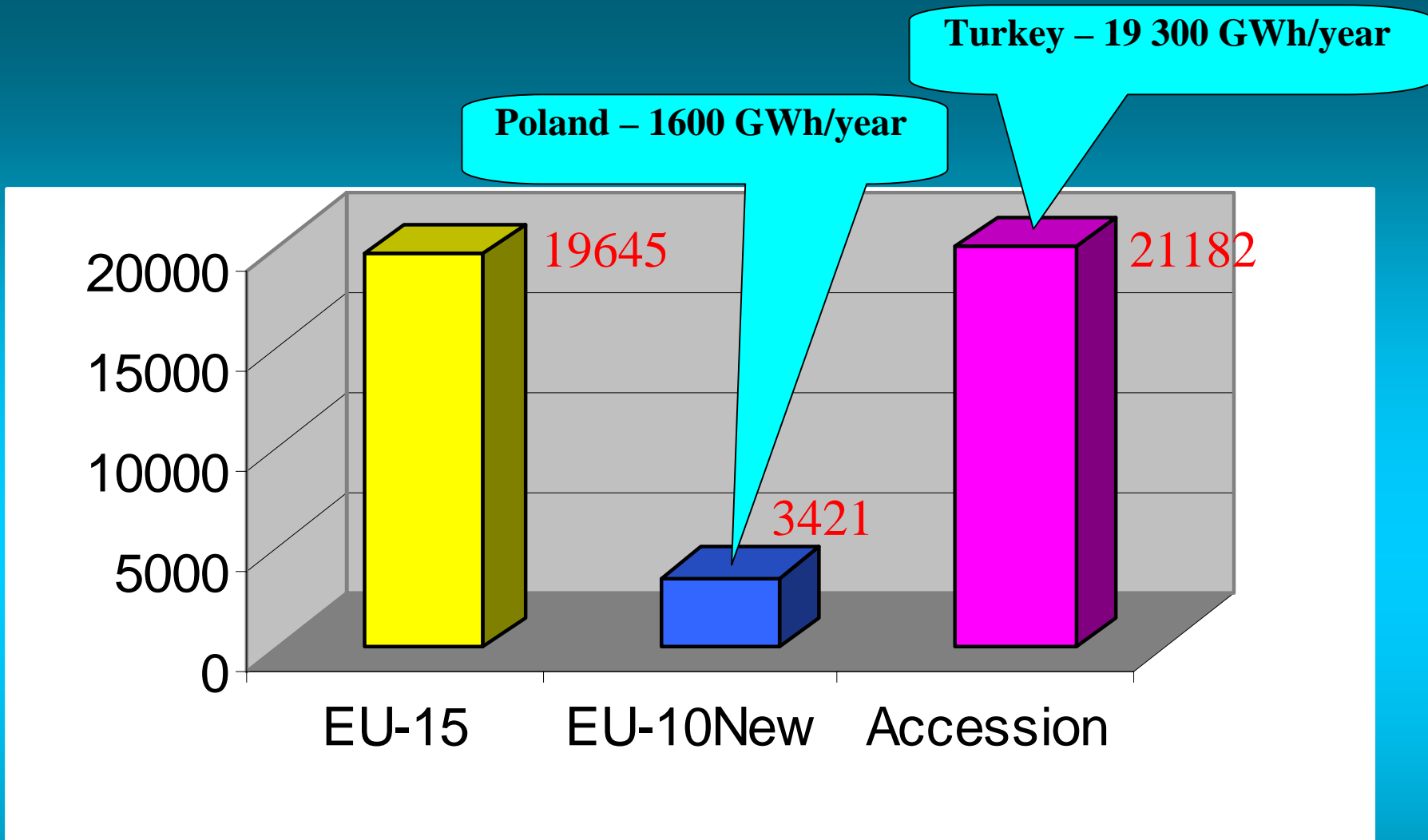
SHP in the Renewable Electricity mix (RES-E)

Developed so far %



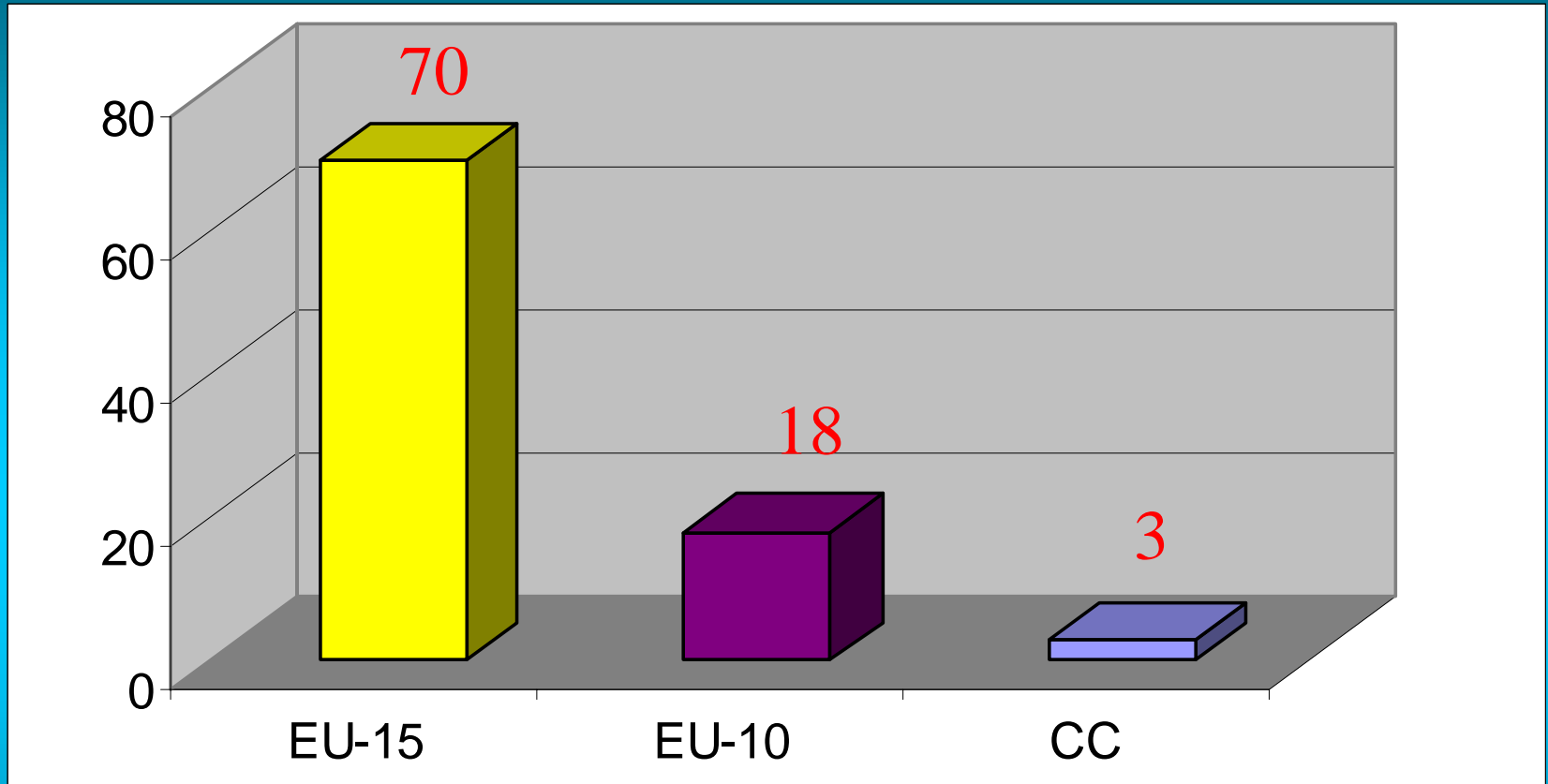
Percentage of developed economically feasible potential so far %

Remaining potential GWh/year



SHP remaining economically feasible potential

Number of SHP manufacturers



Small- scale water turbine manufacturers

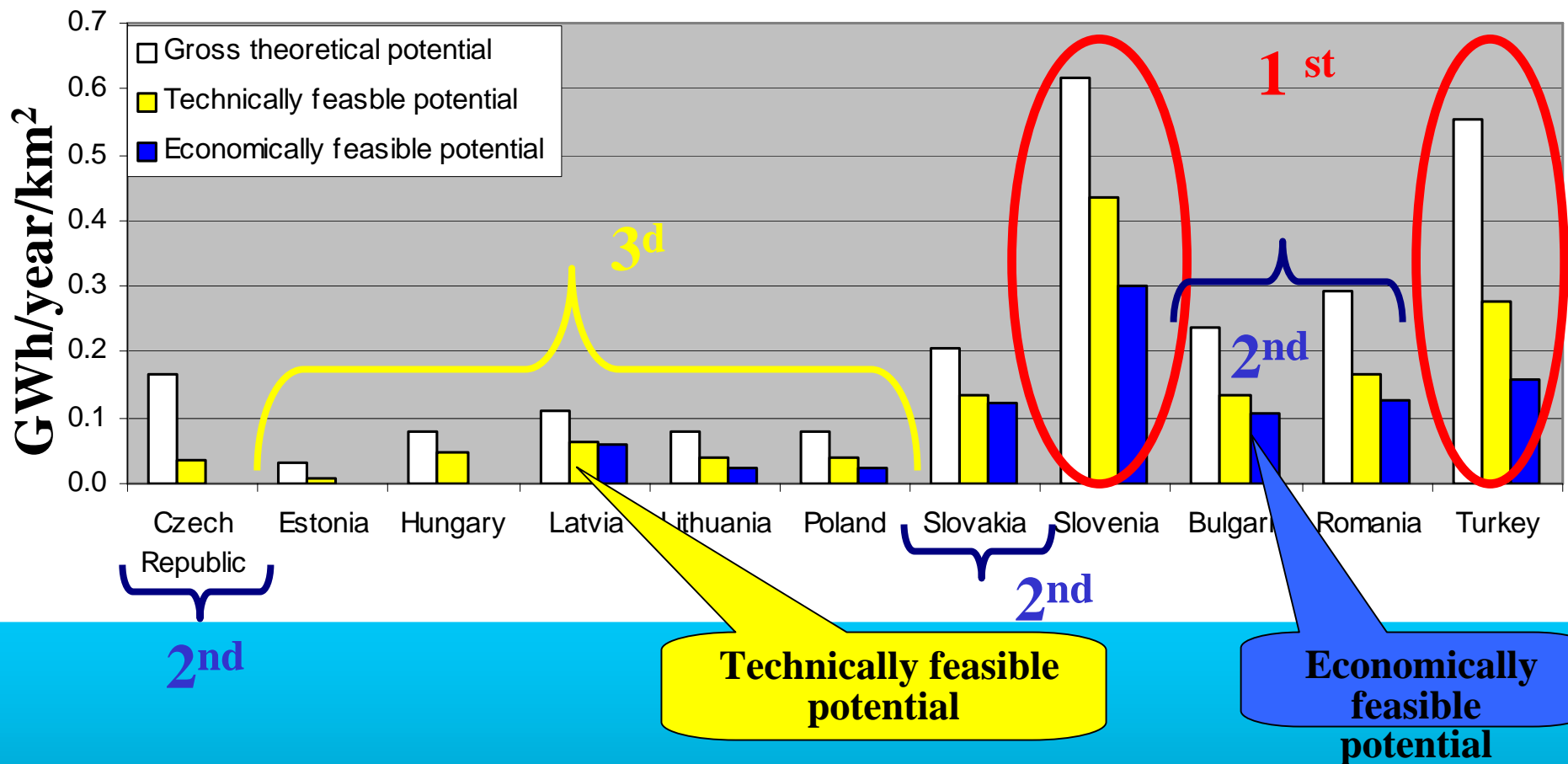
Comparison of SHP sectors (datum: EU-15)

1st2nd3rd

ITEM	Direction	EU-15	EU-10	CC
SHP PLANTS IN OPERATION				
Number of SHP plants	Max	1	<5	<34
Average size of plant	Max	1	<2.3	>2.2
% of old SHP plants	Min	1	<3	<6
INSTALLED CAPACITY AND ELECTRICITY GENERATION				
Installed capacity	Max	1	<12	<16
Electricity generation by SHP plants	Max	1	<15	<28
Electricity generation by a plant of 1 MW	Max	1	<1.5	<1.7
SHP POTENTIAL				
Remaining SHP potential	Max	1	<4.4	1.2
SHP IN THE GROSS ELECTRICITY MIX				
Contribution to gross electricity production %	Max	1	<2.2	<2.3
Contribution to hydropower production %	Max	1	>1.2	<4.7
SHP IN THE RENEWABLE ELECTRICITY MIX				
Contribution to RES-E	Max	1	>1.2	<4
SHP PROJECTION INTO THE FUTURE				
Installed capacity by 2010 (rise in %)	Max	1	>1	>1.2
Electricity generation by 2010 (rise in %)	Max	1	>1.2	>1.3

Individual countries:

**EU –10 and Candidate
countries**



Hydropower specific energy (annual energy divided by the area of a country- GWh/year/km²)

SHP Definition

$P < 10$ MW, except:

Estonia – 1 MW,

Latvia -2 MW,

**Croatia, Hungary, Poland -5
MW**

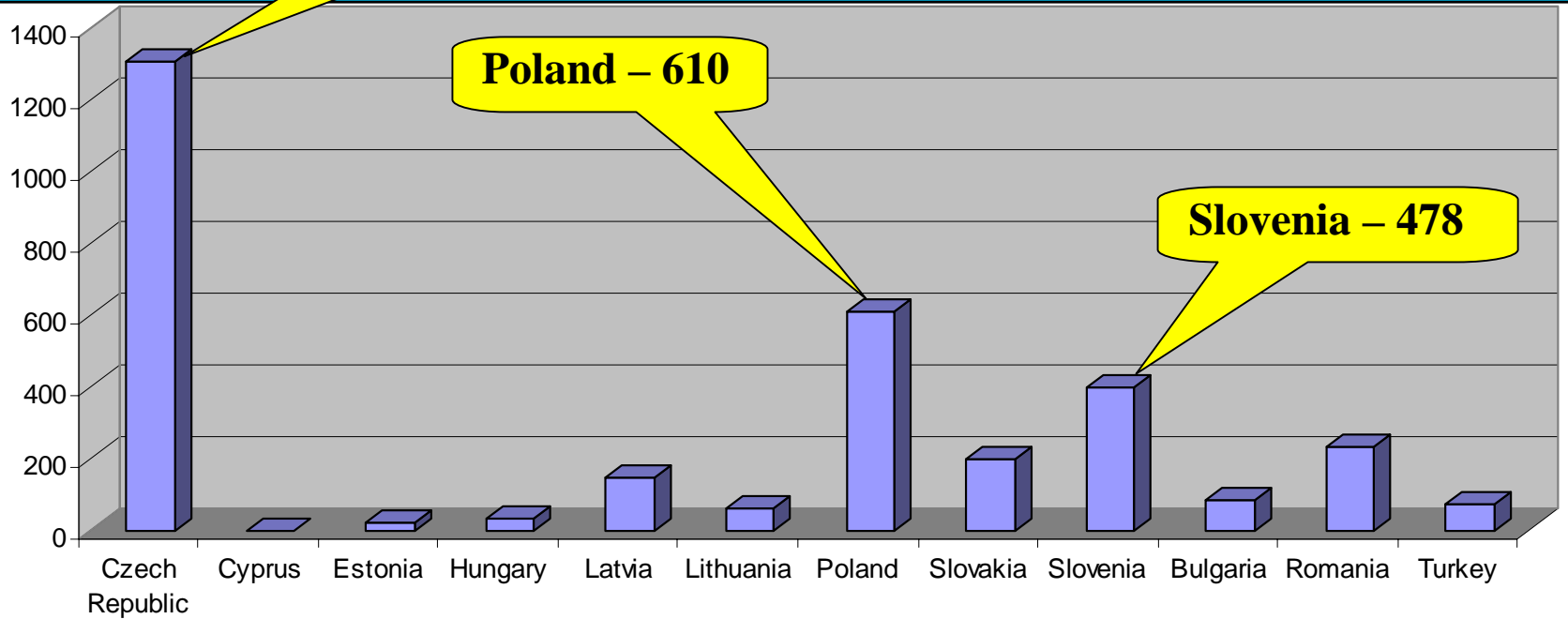
Turkey – 50 MW

Czech Republic – 1330

Poland – 610

Slovenia – 478

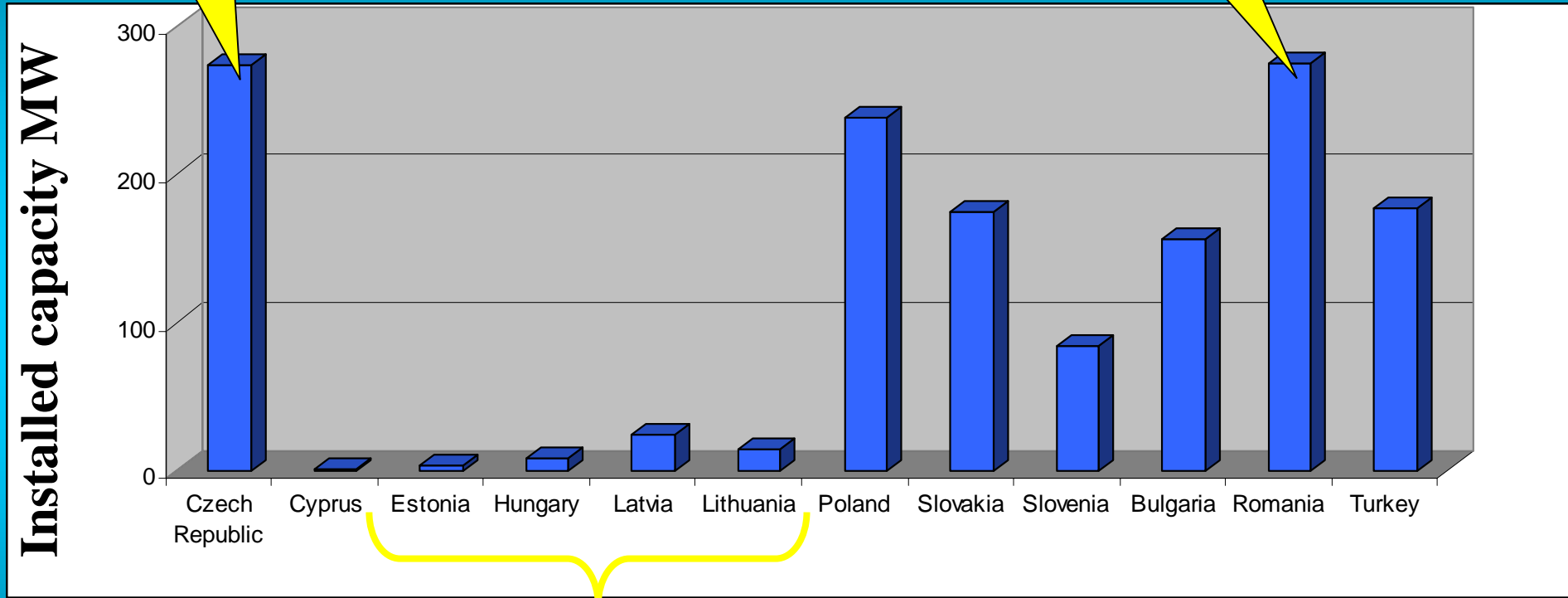
Number of SHP



Number of SHP

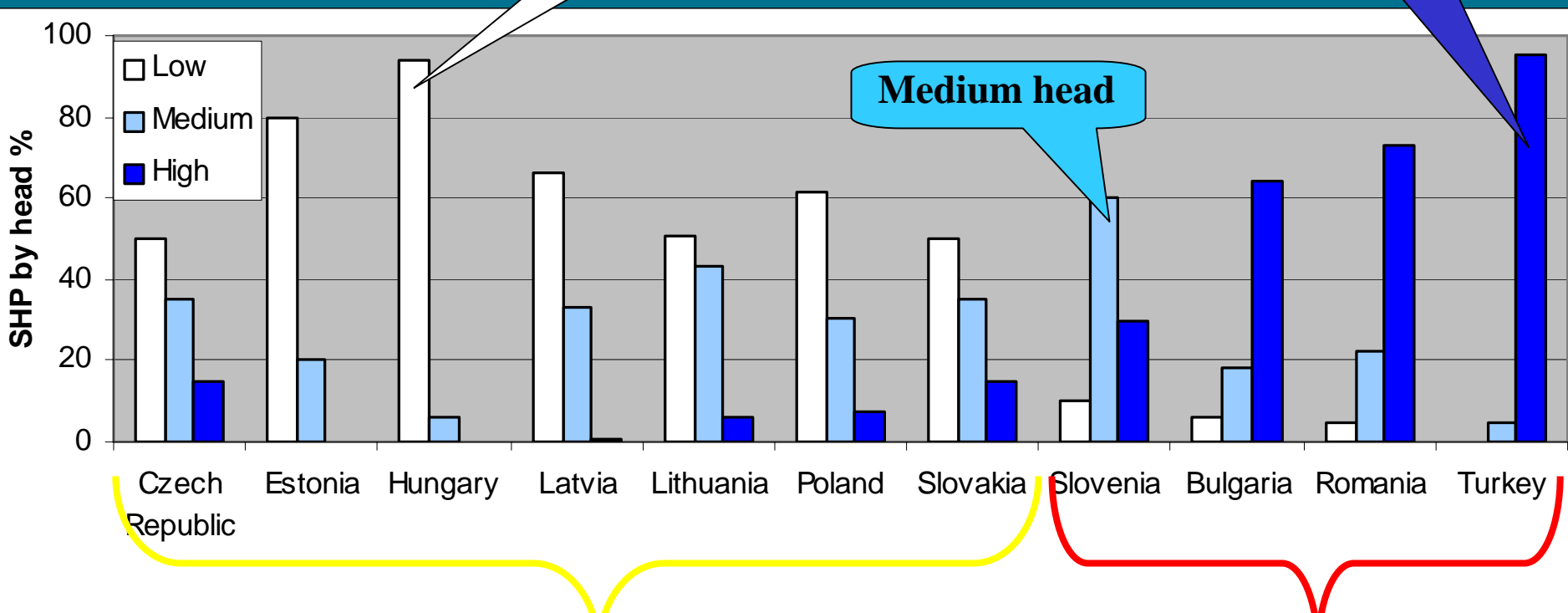
Czech Republic – 275

Romania – 278



Low installed capacity

SHP installed capacity, MW

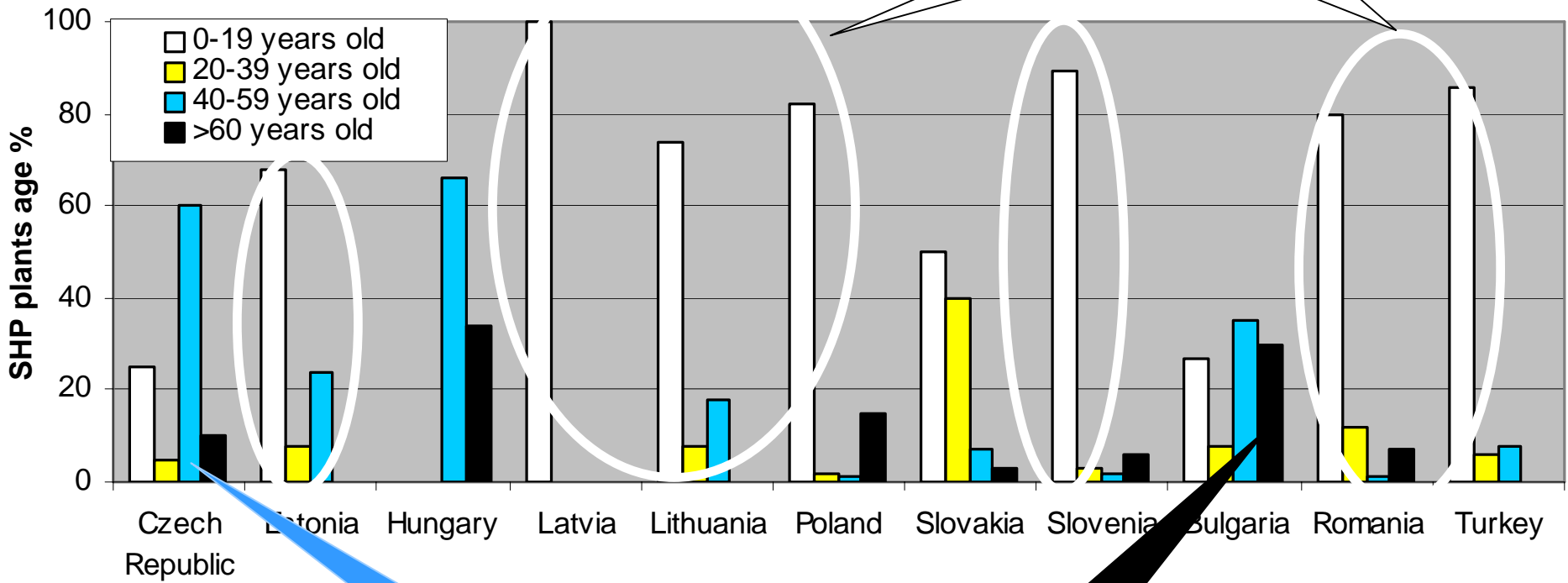


Low head

High head

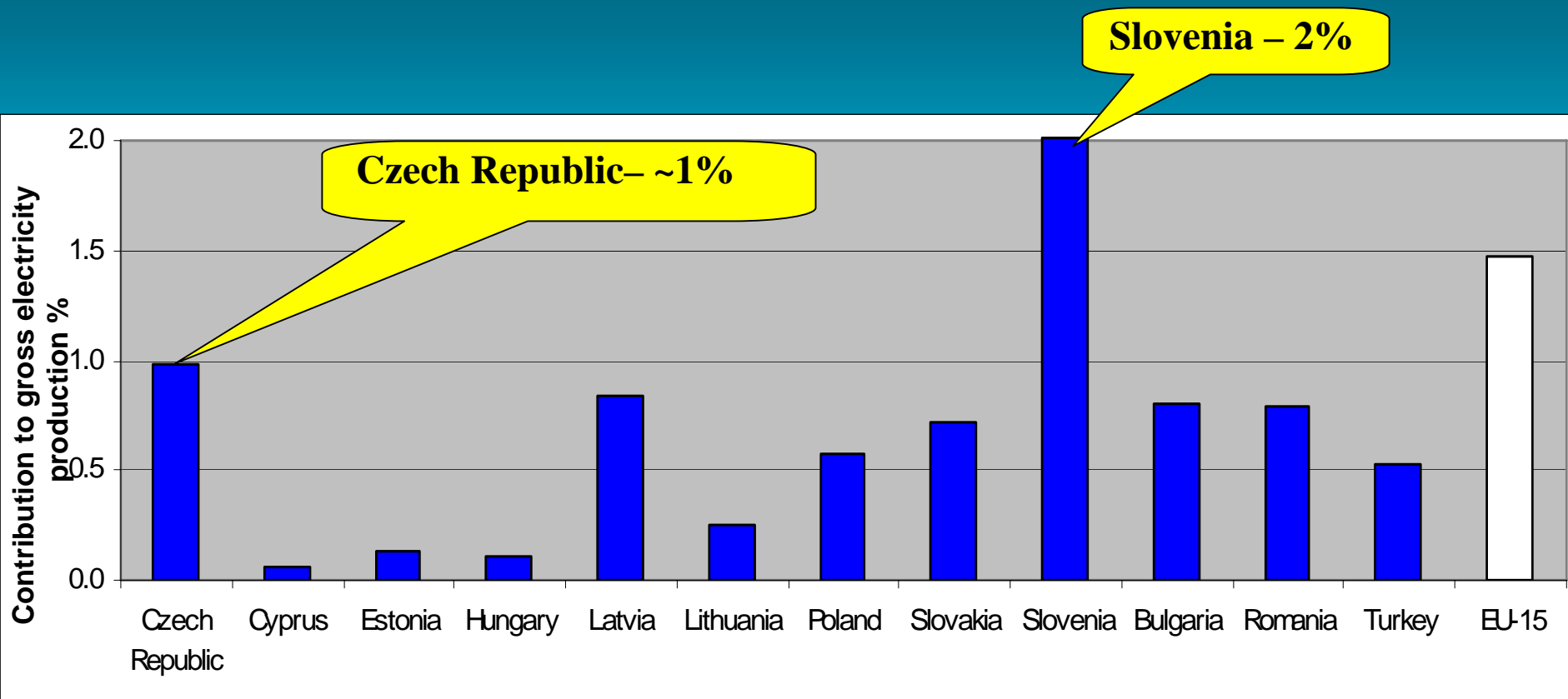
Percentage of small hydropower plants by head (low head <5m, medium head 5-15m, high head >15m)

Young plants

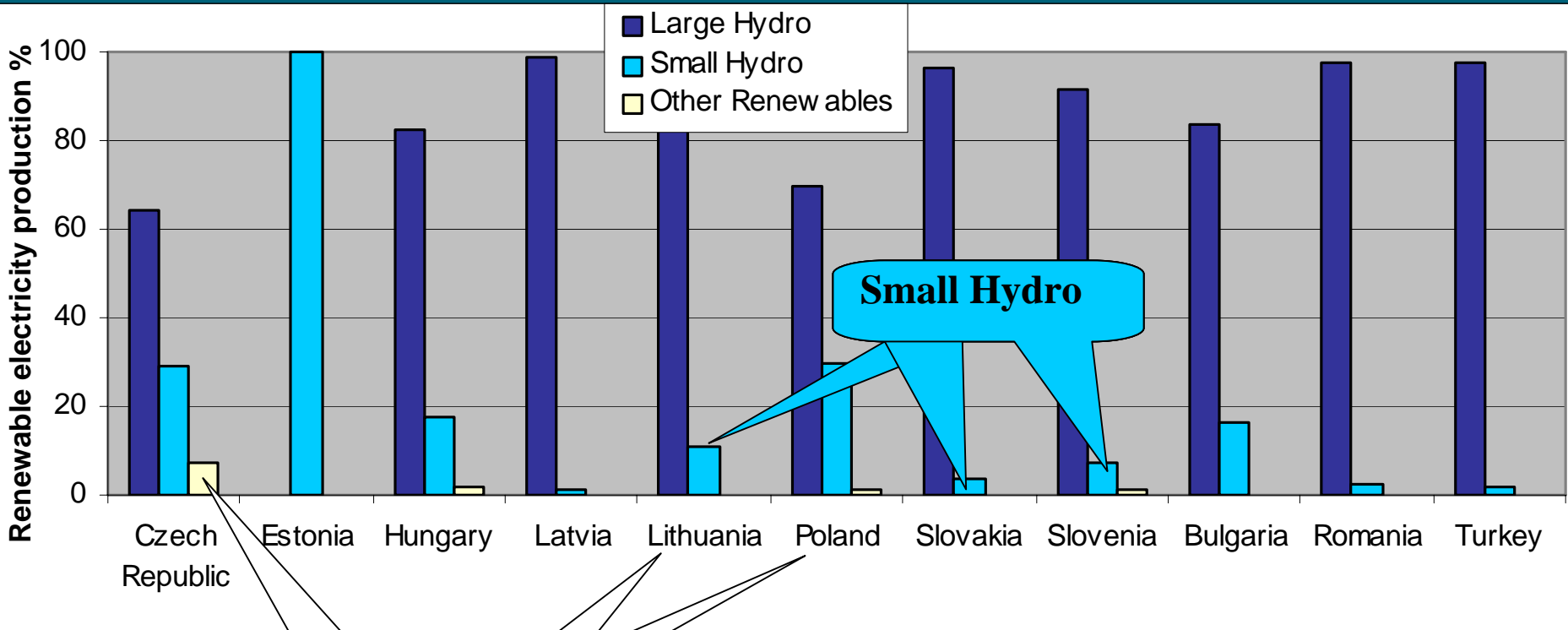


Old plants

SHP plants age distribution



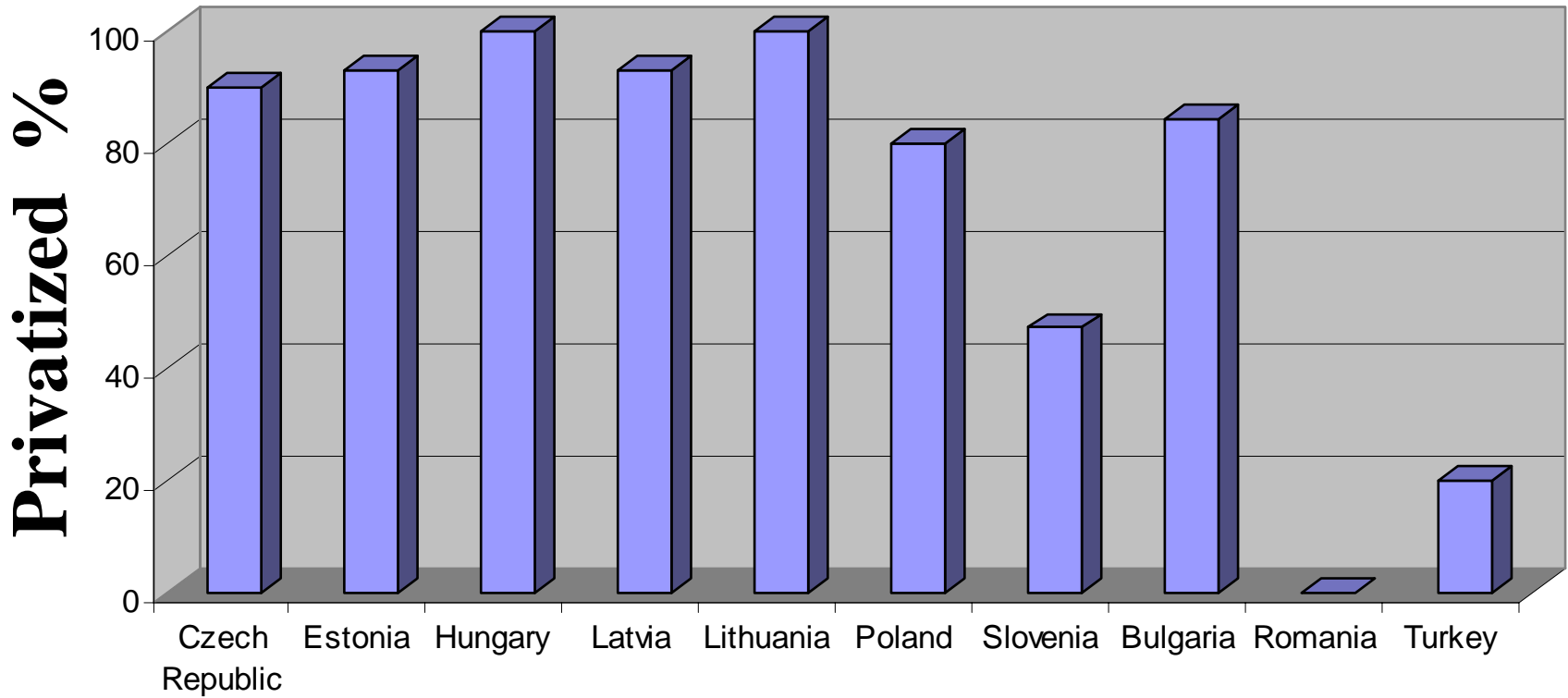
SHP contribution to gross electricity generation



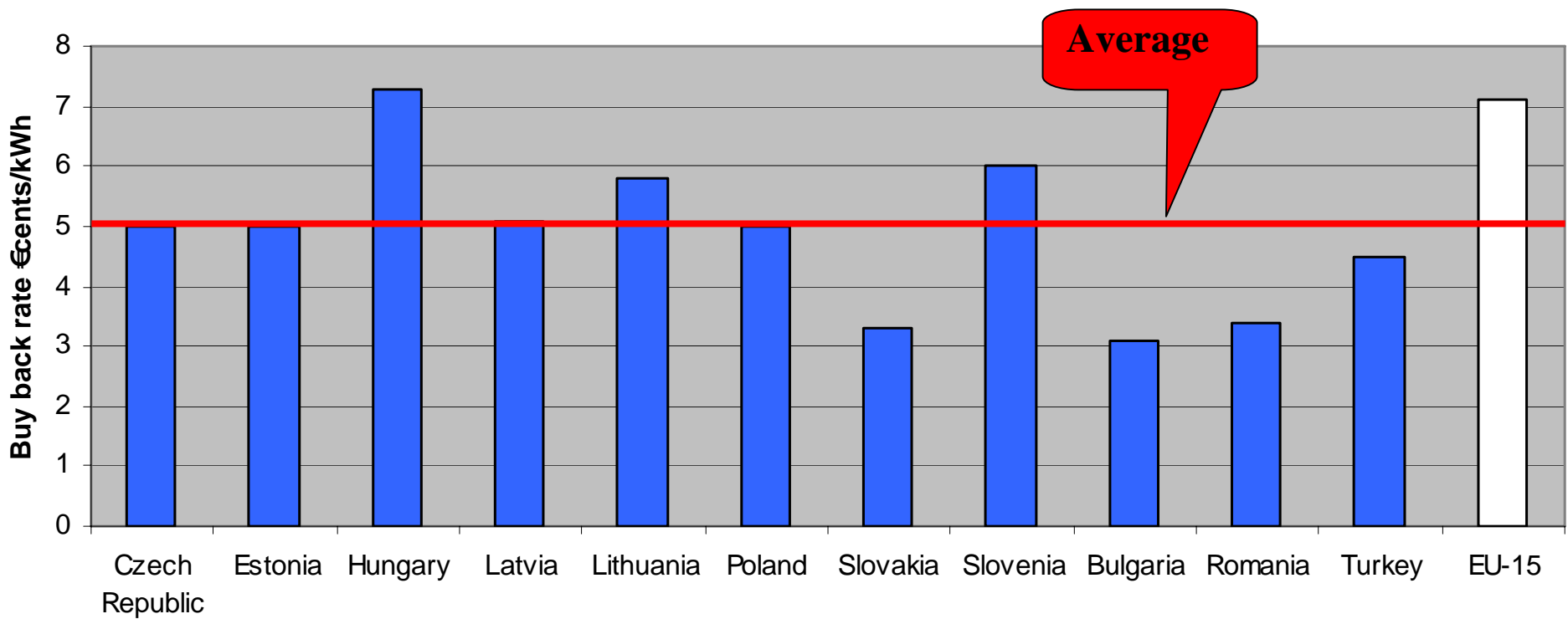
Other RES-E

Small Hydro

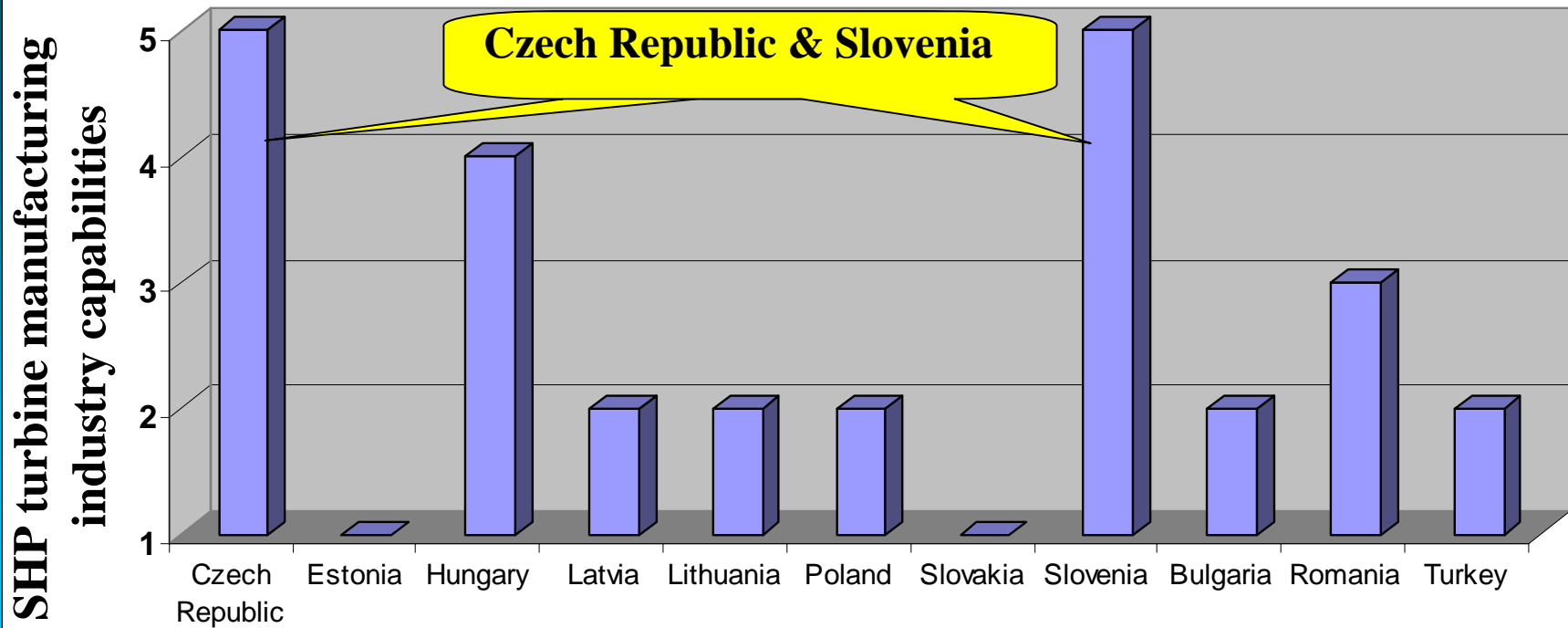
Share of large and small hydro, and other renewable energy sources in the total renewable electricity generation



SHP Ownership



Buy back rates (€cents/kWh)

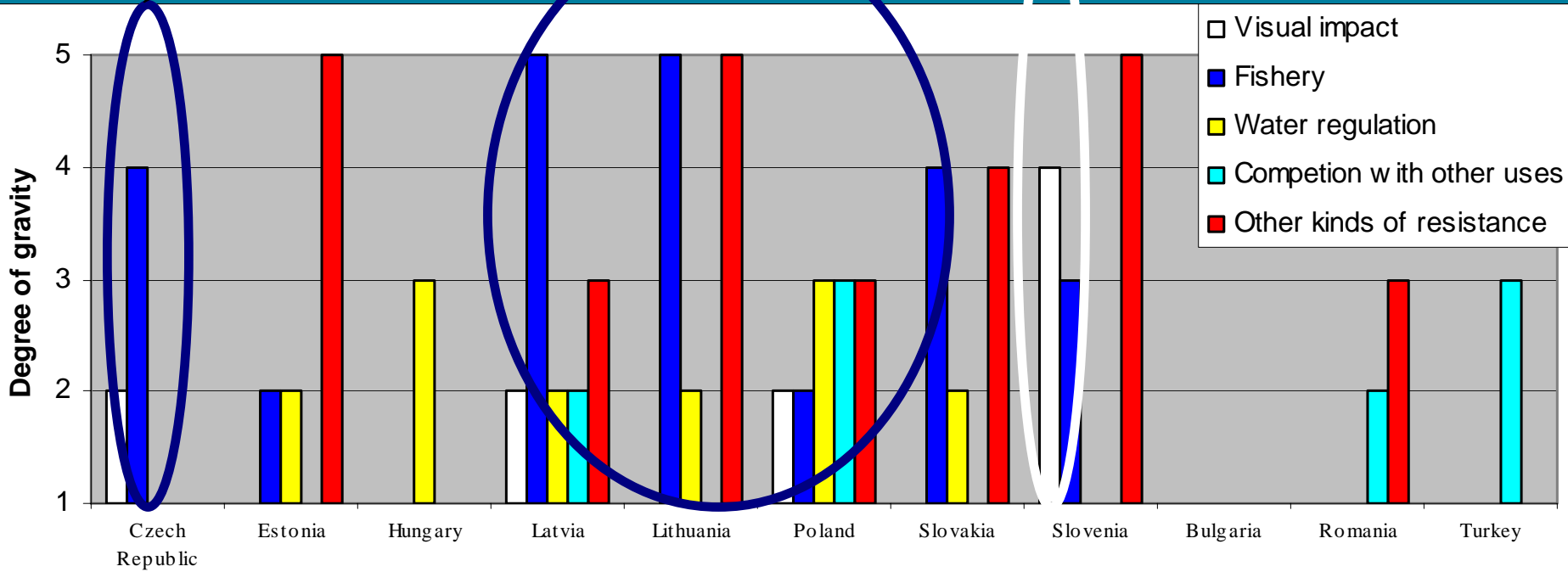


1= no turbine manufacturers, 2= Turbine manufactures exist, but they are not able to cover domestic demand, 3= Turbine manufactures exist; they are able to cover domestic demand with limited export capacities, 4= Turbine manufactures exist; they are able to cover domestic demand with some export capacities, 5= high capability of turbine manufacturing industry)

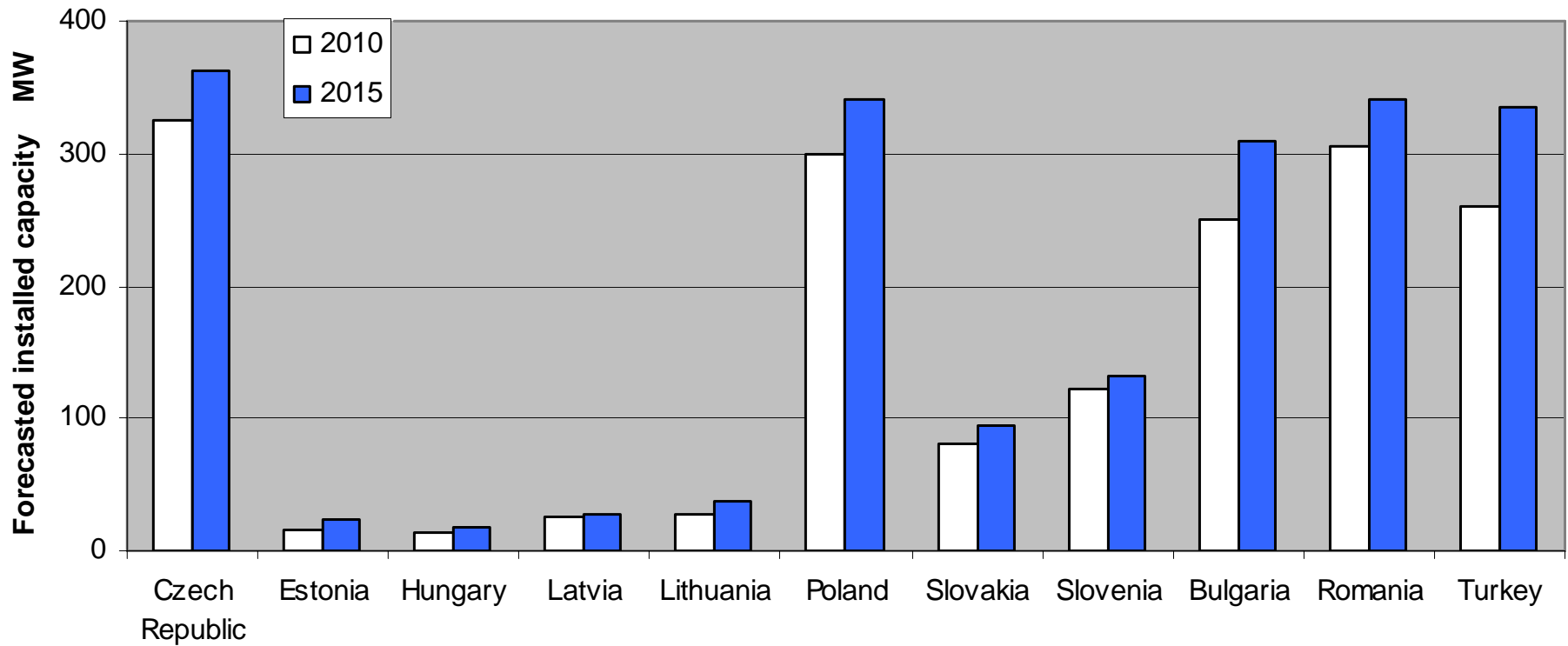
SHP INDUSTRY STATE

Fishery

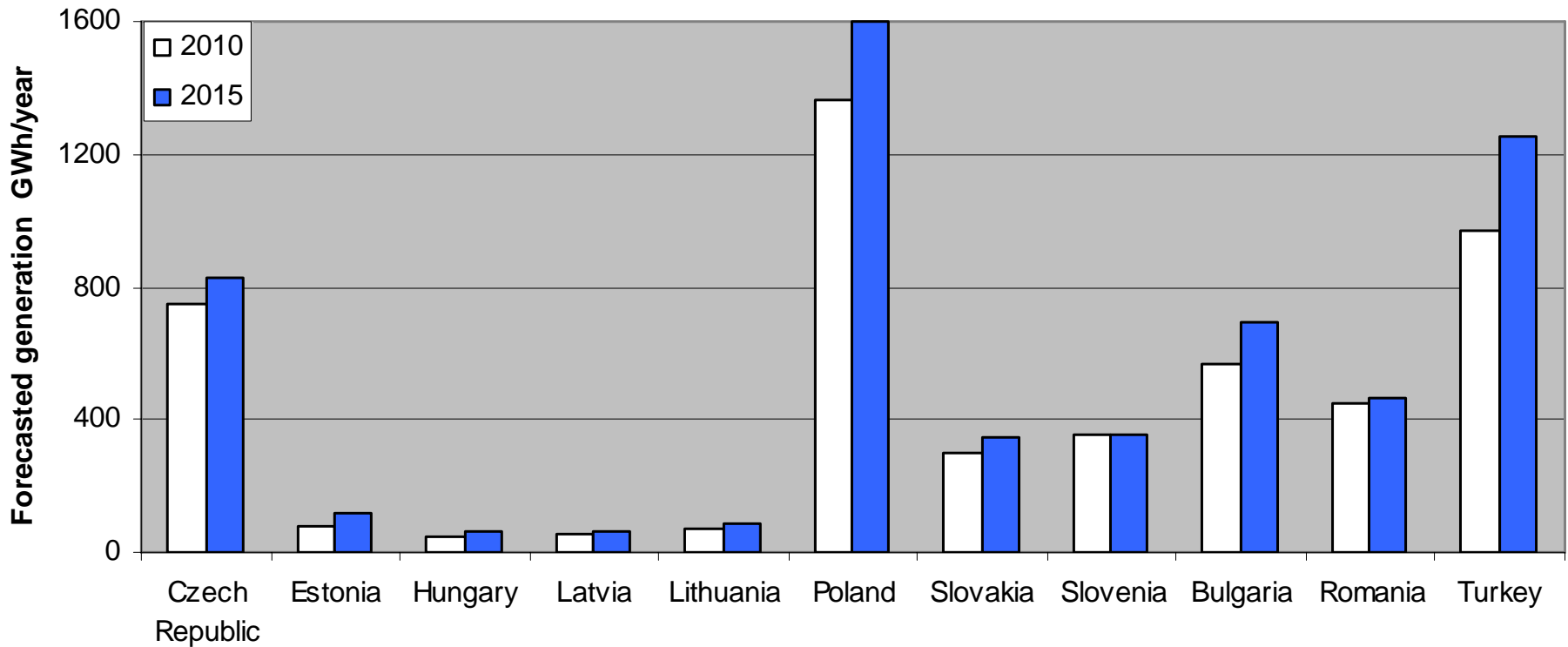
Visual impact



Resistances to SHP development (1-no impact, 5- severe impact)



Forecasted SHP installed capacity (MW) by 2010 and 2015



Forecasted SHP electricity generation (GWh/year) by 2010 and 2015

CONCLUSIONS

Only general fragments of SHP situation basically related to the SHP statistics in the New Member States and Accession countries are outlined here. More detailed information on SHP in each country is given in its profile.

The report is available at ESHA Website.

<http://www.esha.be/Library.htm>

Please visit the Network Website:

<http://www.esha.be/ukthematic.htm>



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Thank you for attention !

