

SESSION V

Small hydropower and the Water Framework Directive

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SMALL HYDRO DEFINITION

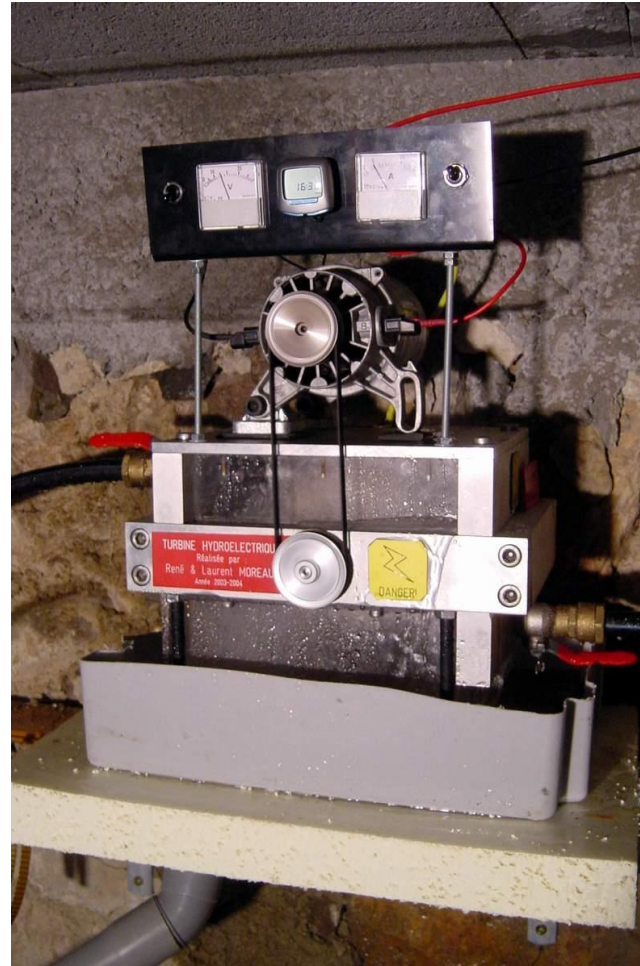
“Hydroelectric power plant with an installed
 (maximum) capacity up to 10 MW”



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Public perception of small hydro pico hydro - 600 W



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Public perception of large hydro

Sorry, but this is small hydro (6,7 MW), too.....



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This is Large Hydro



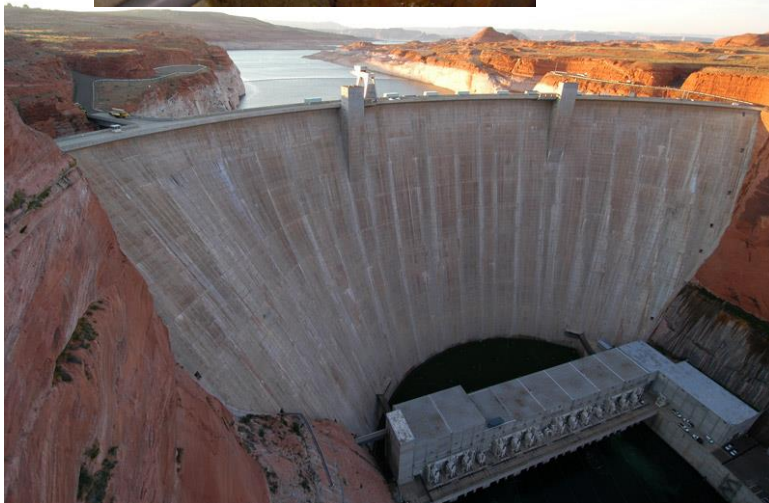
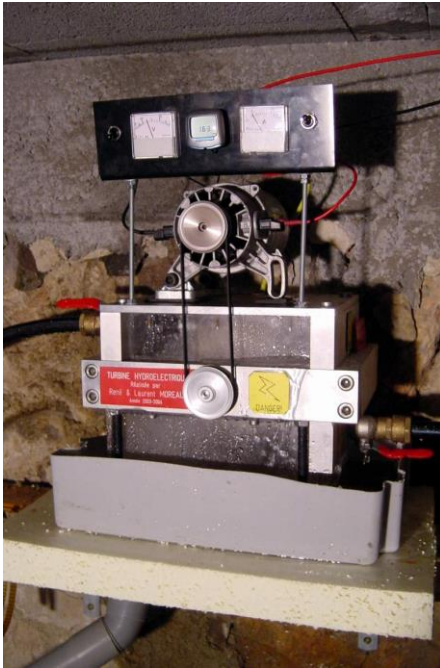
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This is the Largest Hydro ever



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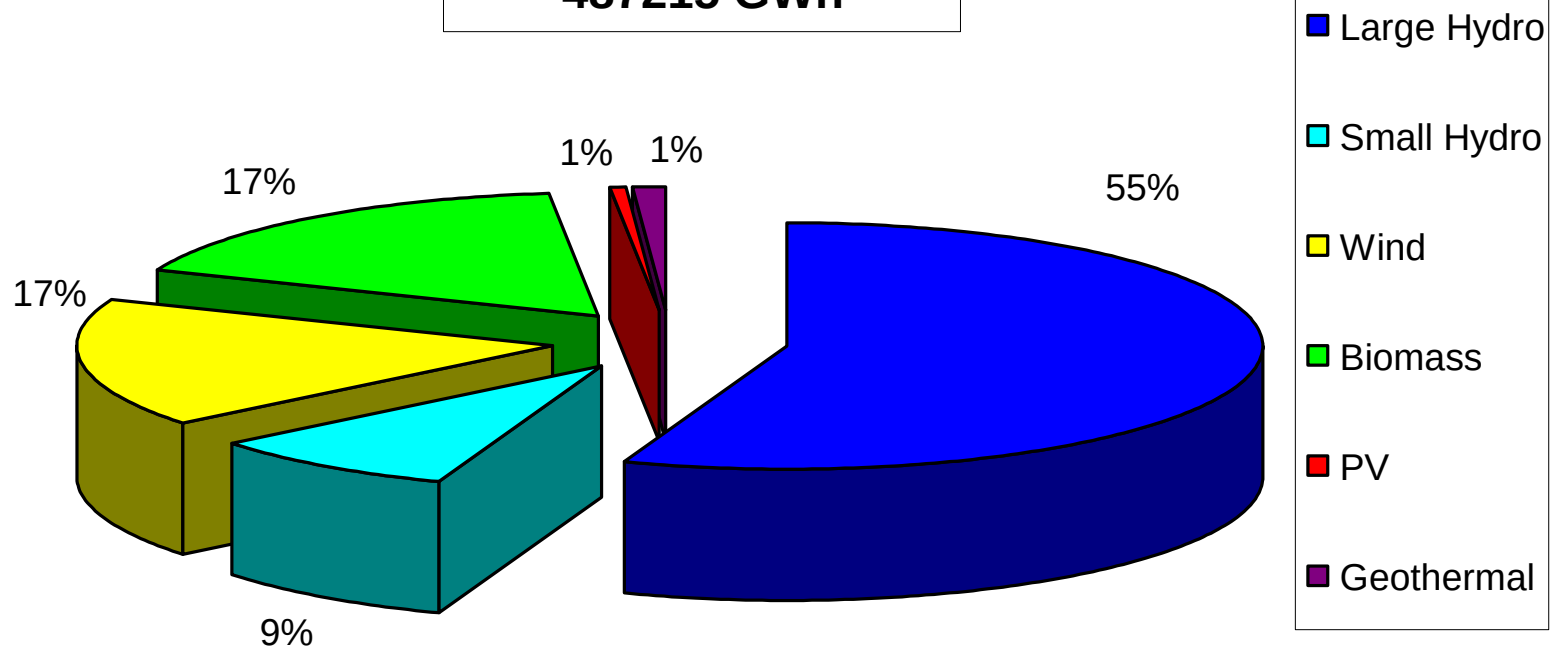
Which is sustainable hydro?



BASIC FIGURES

RES-E in the EU-27, 2006 (percentage of GWh)

487215 GWh



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CONFLICTS?

WFD-2000/60/EC



RBMPs



Quality targets

RES-e-2001/77/EC



Energy Plans



20-20-20 targets



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DOES SMALL HYDRO “HEAVILY MODIFY” A WATER BODY?

Outcomes of the CIS Workshop in Brussels, 12-13 March 2009

No general rule **but**

Homogeneous criteria in all MS are needed

Transparency in designation is needed

Homogeneous approach in GEP definition is needed **But, in the end....**

DOES IT REALLY MATTER (FROM SHP POINT OF VIEW) ?



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HMWB

Ecological status

1. X %? loss of production
2. Y% increase in operation costs
3. Z% of ???

GEP

WB

1. X %? loss of production
2. Y% increase in operation costs
3. Z% of ???

GES



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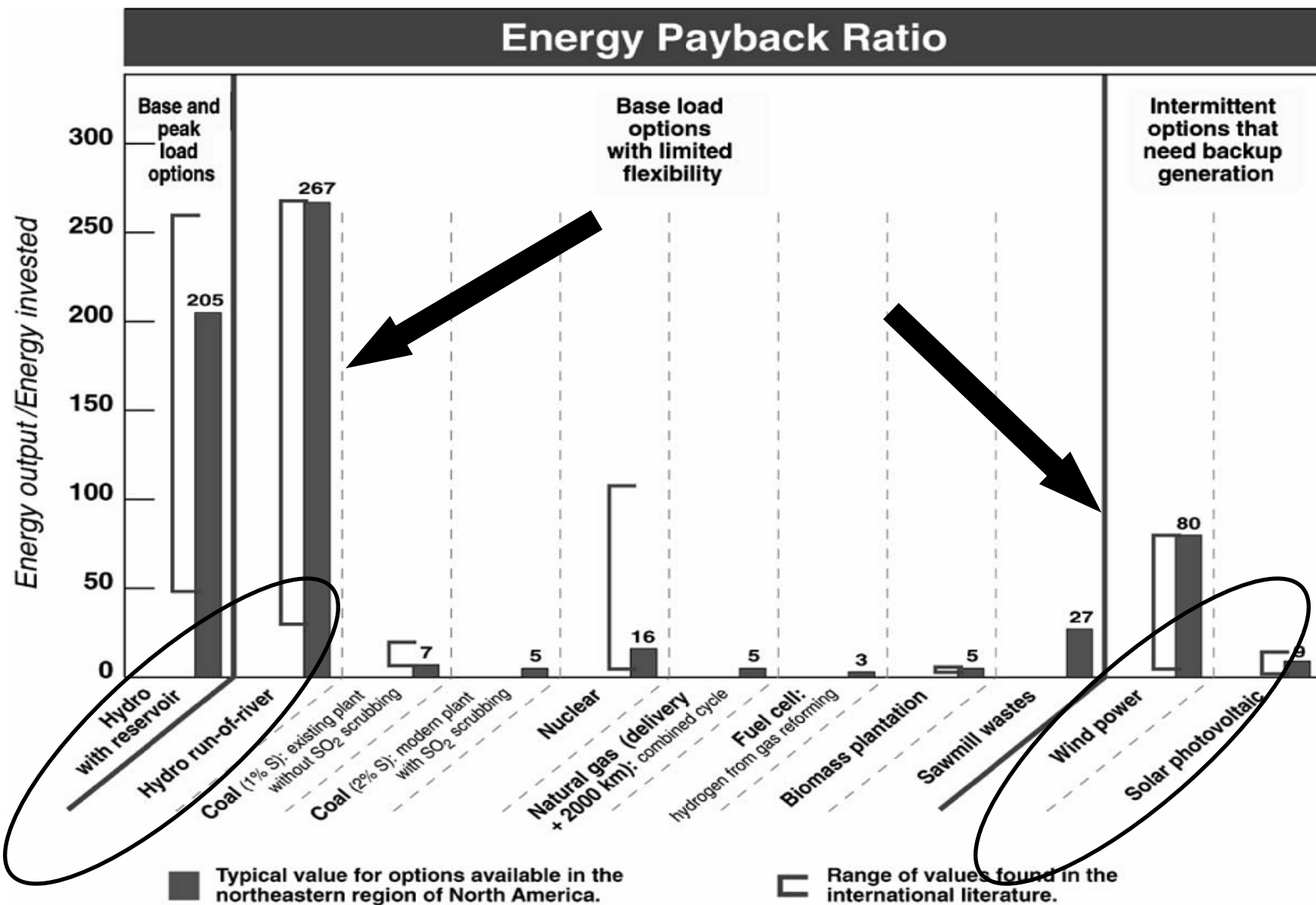
Better environmental options?

- Replacement by other renewable energy (national level)
 - *Difficult with another RES with the same characteristics (continuity, predictability, storage, etc....)*
- Replacement of peak load production/ ancillary services /security of electricity supply by other renewable energy
 - *Which other RES?*
- Some MS admitted that hydropower has:
 - a) the lowest cost per unit among renewable energy sources today and
 - b) the lowest environmental costs as compared with energy production based on biomass, gas production and coal-fired power



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Better environmental options?



MEASURES

WFD and hydromorphological pressures – 2006 – Case studies

Measure	Nr.
Reserved flow	6
Fish pass	12
Dam removal	3
River restoration	2

Key conclusion (NO) 2009: *the most important potential measure was environmental flow with adverse effect on use (power production), independent of approach (to define GEP).*



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Expected impacts of WFD on existing small hydro

Reduction of energy production due to increase of reserved flow

Reduction of energy production due to sediment management

Increase in investment and operation costs due to new fish passages

Restriction in the water level management of storage basins

Increase in investment and operation costs due river restoration measures



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FUTURE PERSPECTIVES OF SMALL HYDRO AFTER WFD IMPLEMENTATION

WFD Objectives

No further deterioration of
WBs

Protection, enhancement
and restoration of WBs

No more hydro?

Impossible to say....



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Example: criteria to assess substantial changes in character

MS1: height of transversal in-stream structures

MS2: automatically if a pressure (HPP) is in it

MS3: X% of WB affected

MS4: sorry, we don't know yet...

MS5: please ask to experts...

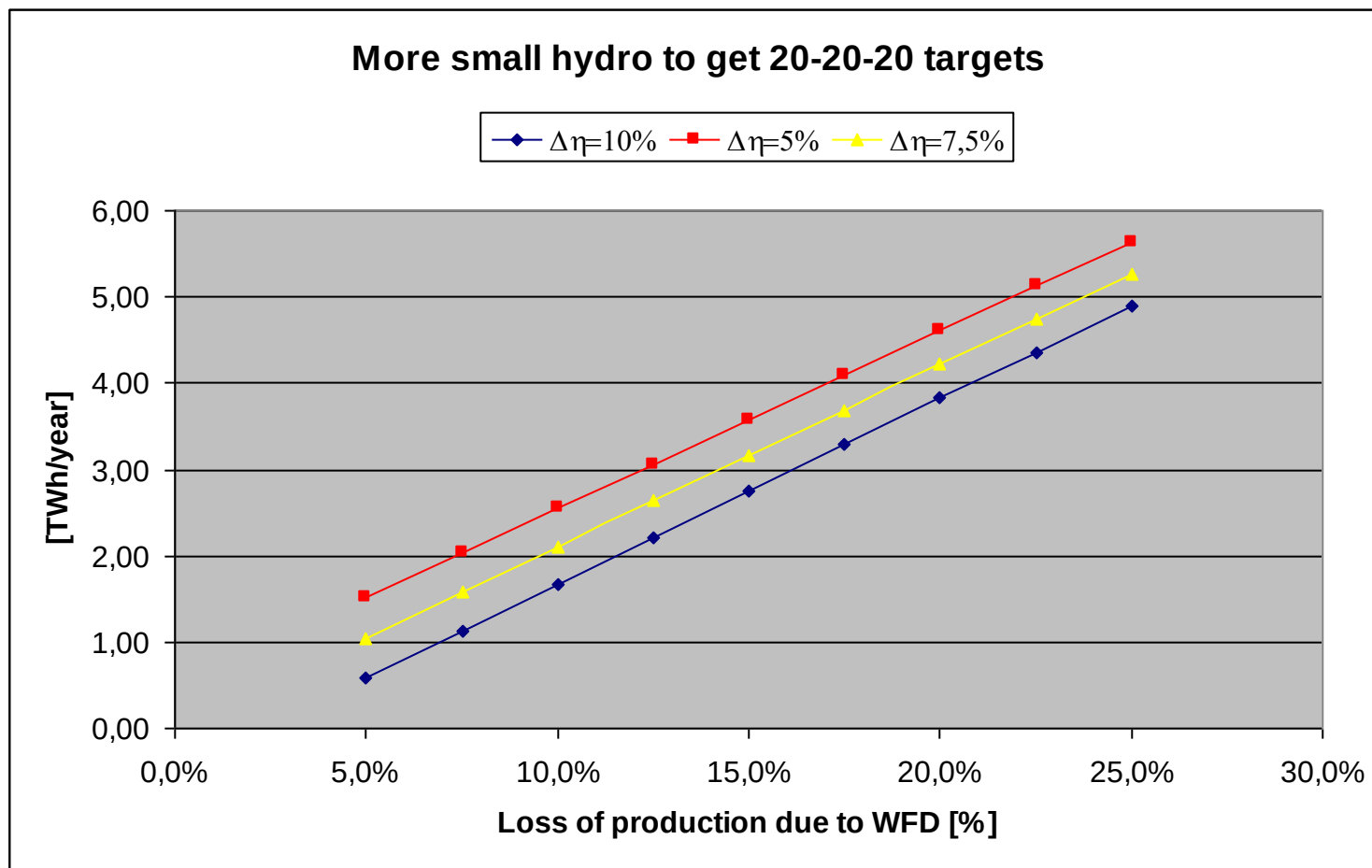


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FUTURE PERSPECTIVES OF SMALL HYDRO AFTER WFD IMPLEMENTATION

That's great!!!

....but mere theory



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Perspectives??

Multipurpose plants (electricity production combined with drinking water supply systems, waste water treatment plants, irrigation channels,....)

Low-head and very low head plants. 1 - 1.5 GW more hydro?

Pico - Micro hydro

Small pumped storage hydro

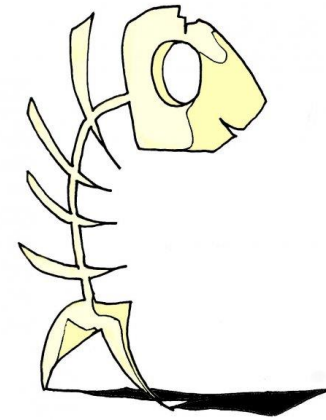
Small hydro plants certification



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CONCLUSIONS

NO WATER, NO FUN



NO HYDRO, NO FUN



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Contribution of RES to total final energy consumption (Mtoe)

Type of energy	2005		2006		Projection 2010		Targets 2020	
	Eurostat	%	Eurostat	%		%		%
Final Energy Consumption ¹ (Trends to 2030) [*] (Combined RES and EE) ^{**}	1,211.5		1,214.8		1,272		1,378 1,266	
Wind	6.06	0.50	7.05	0.58	15.13	1.19	41	3.0-3.2
Hydro ²	29.82	2.46	30.71	2.53	30.95	2.43	33	2.4-2.6
Photovoltaic	0.13	0.01	0.22	0.02	1.72	0.14	15.5	1.1-1.2
Biomass	67.51	5.57	73.11	6.02	102.60	8.07	175.5	12.7-13.9
Geothermal	1.10	0.09	1.16	0.10	3.86	0.30	9.4	0.7
Solar Thermal	0.68	0.06	0.77	0.06	1.5	0.12	12	0.9-1.0
Solar Thermal elect.	0		0		0.16	0.02	2.2	0.2
Ocean	0		0		0.08	0.01	0.4	0.03
Total RES	105.3	8.69	113.02	9.30	156.0	12.3	289	20.9-22.8

10,4 TWh/yr = 7,46 % more hydro!!!

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Good Ecological Status ?

Good Ecological Potential ?????



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