Jaromír Čihák

Mikrotik

Alternative power

Who is Jaromir ?

Jaromír Čihák

SysDataCom founder
Mikrotik trainer
Network enthuziasist

someone who know how to levitate
Mikrotik ->

Why alternative power ?

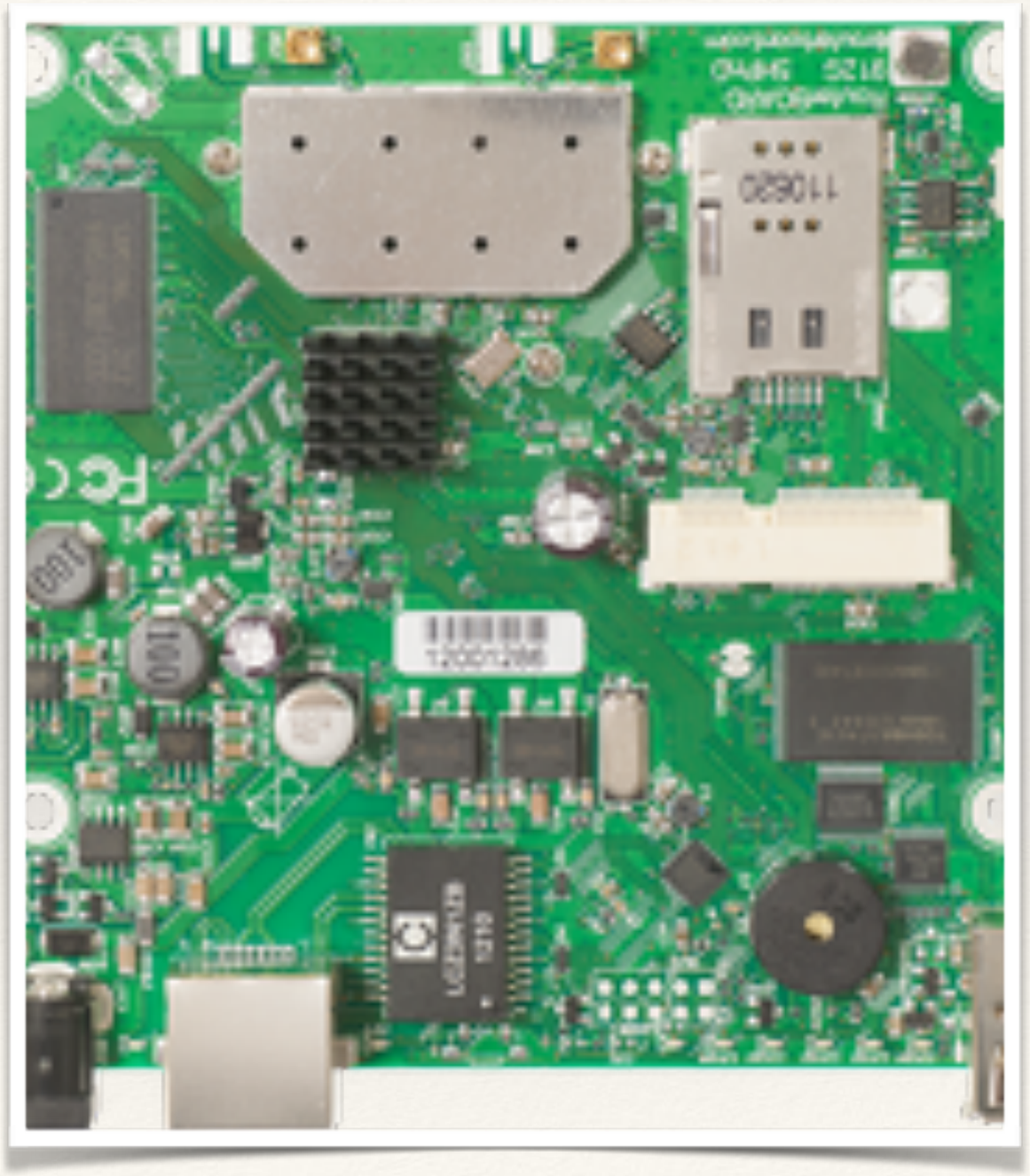
Rural relay tower installation

- Could be install
- Where is no
- POWER !

Mikrotik consumption

RB 912 UAG-5HPnD

- Consumption
  - Datasheet 14W
  - Real 2.5W
  - Real with LTE modem 4.8W

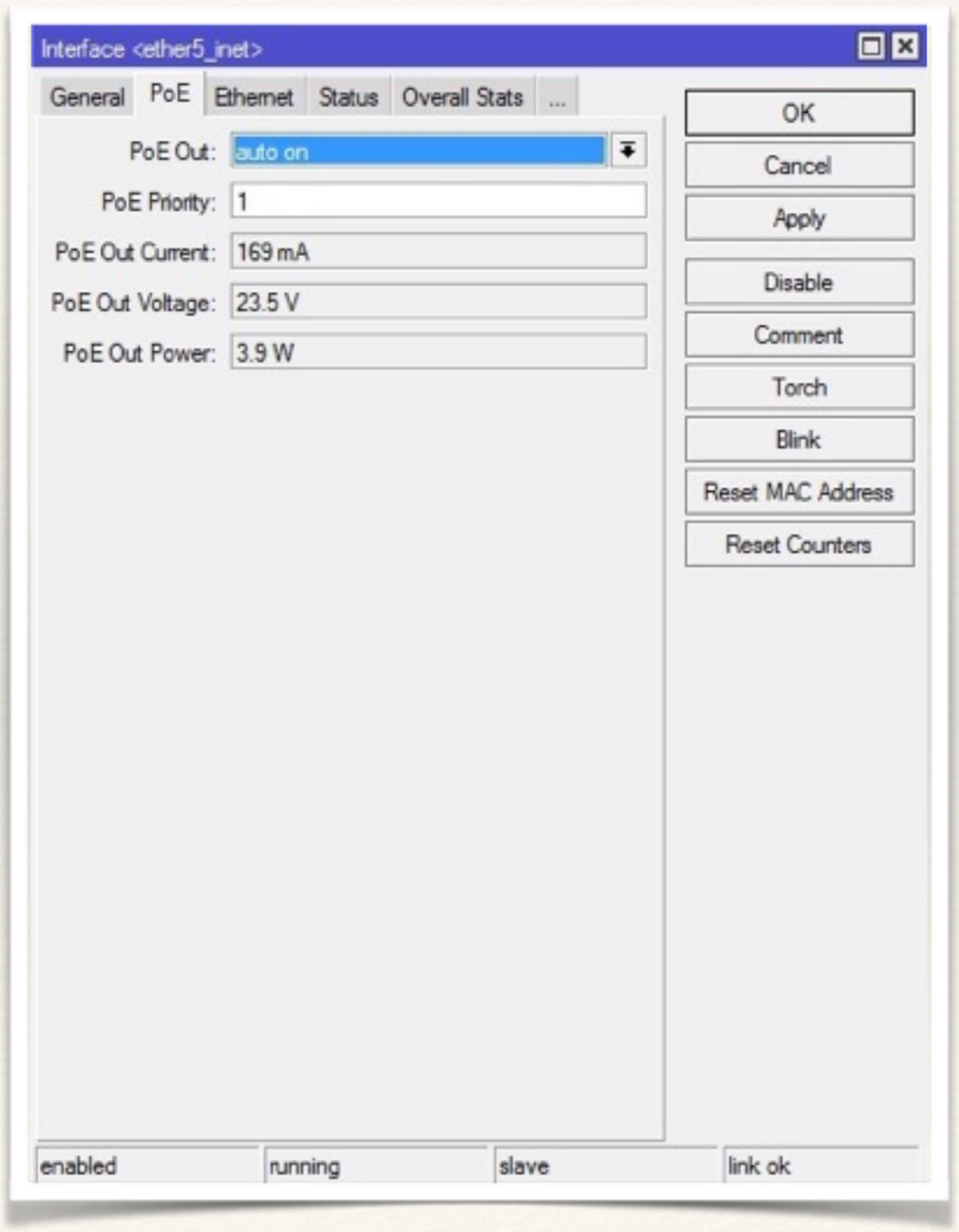


RB 750 UP

- Consumption
  - datasheet 3w
  - real 3W
- PoE
  - 1 port PoE
  - 2-5 port up to 0,5 A current

RB 750 UP

- PoE
  - priority
  - firmware
  - Auto on
  - Forced on
  - Off mode



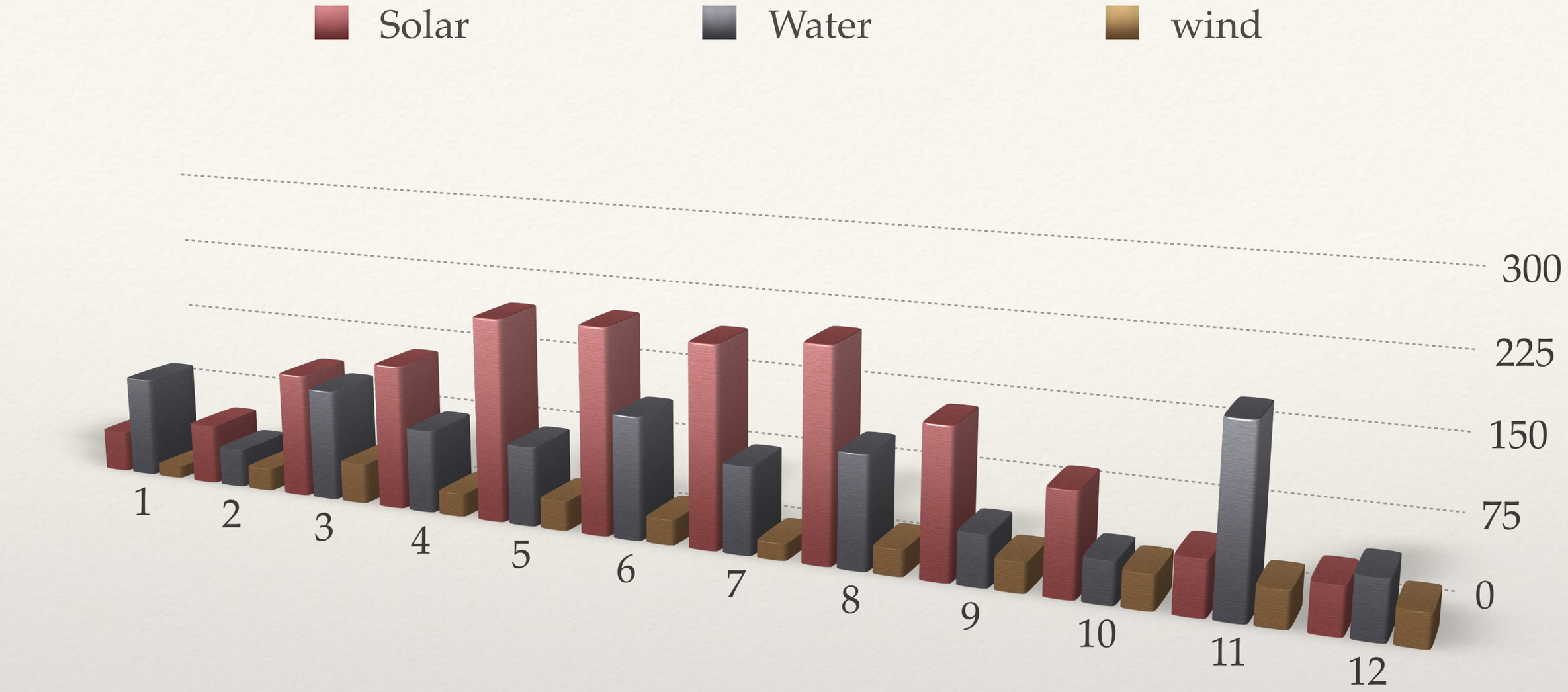
feature	version 1.x	version 2.0
max limit on port	500mA	1A
total limit	2A	2.2A
poe-priority	not available	per port priority adjustable
monitoring	not available	information about each port
PoE in long cable mode	not available	available
Check PoE controller FW version	newer RouterOS	available

PoE firmware

/interface ethernet poe settings upgrade

Known power alternative

- Solar
- Water
- Hydrogen
- Steam
- ..?



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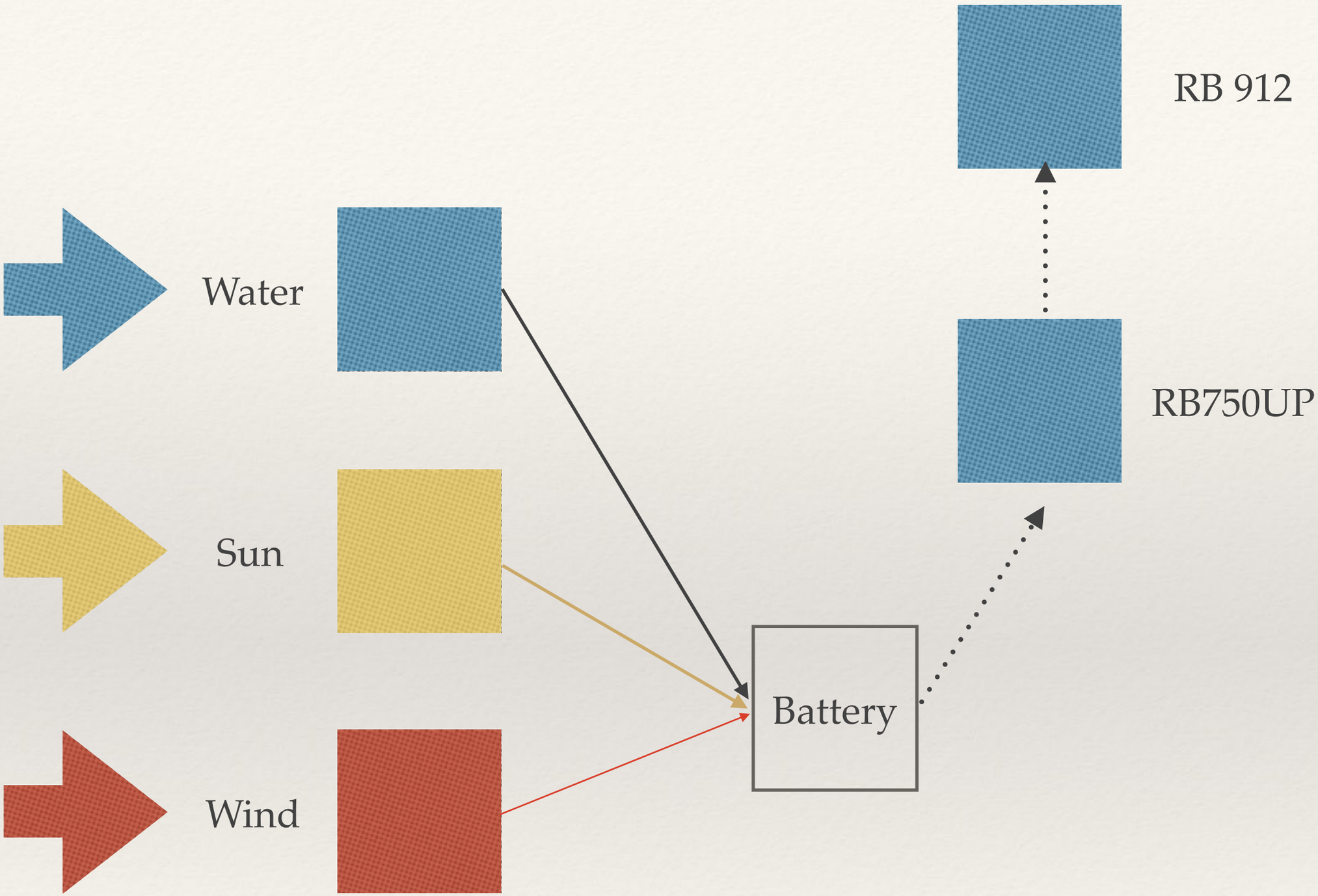
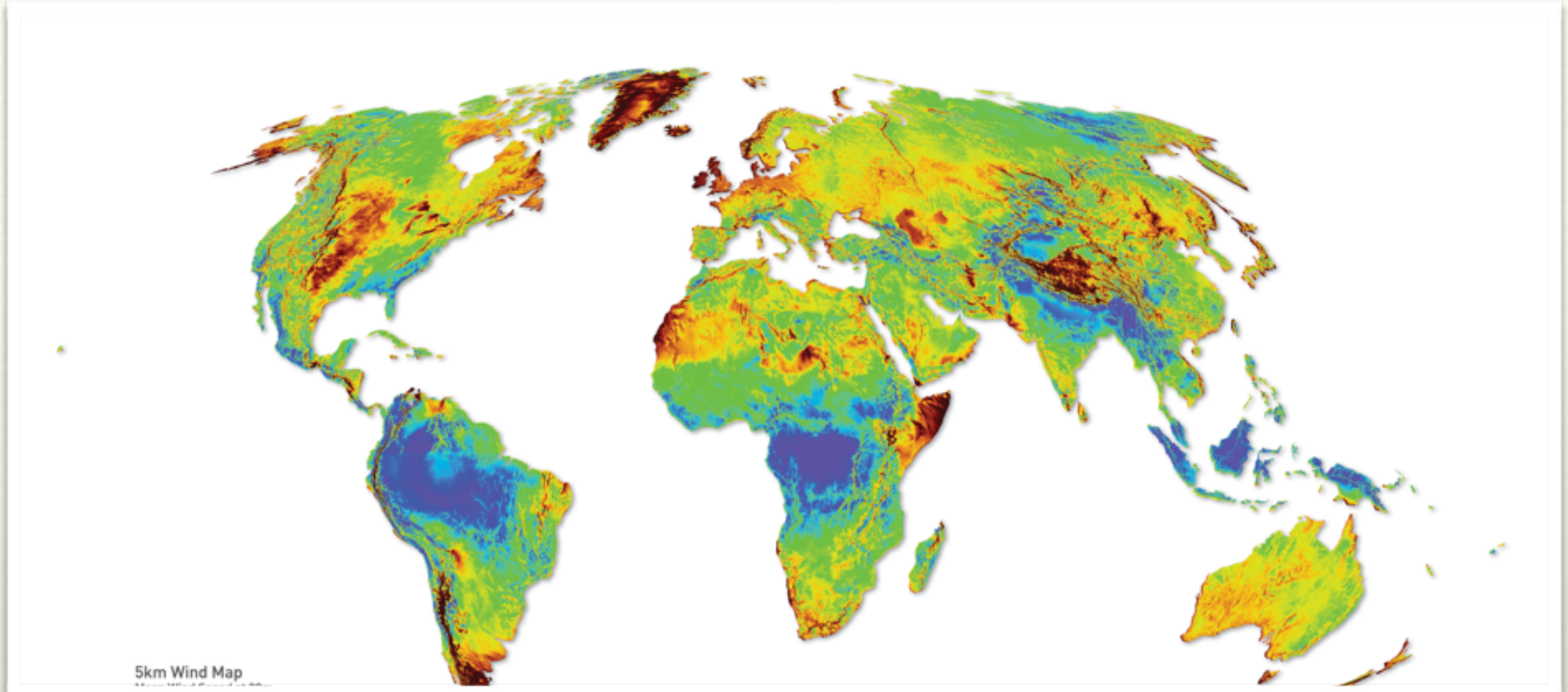
Solar - Water - Wind

usable power through year


RB 912
Water
RB750UP
Sun
Battery
Wind

Battery

- PB baterry
  - cheap
  - acid
  - 200-500 cycles
- LiFePol4
  - expensive
  - green
  - >5000 cycles



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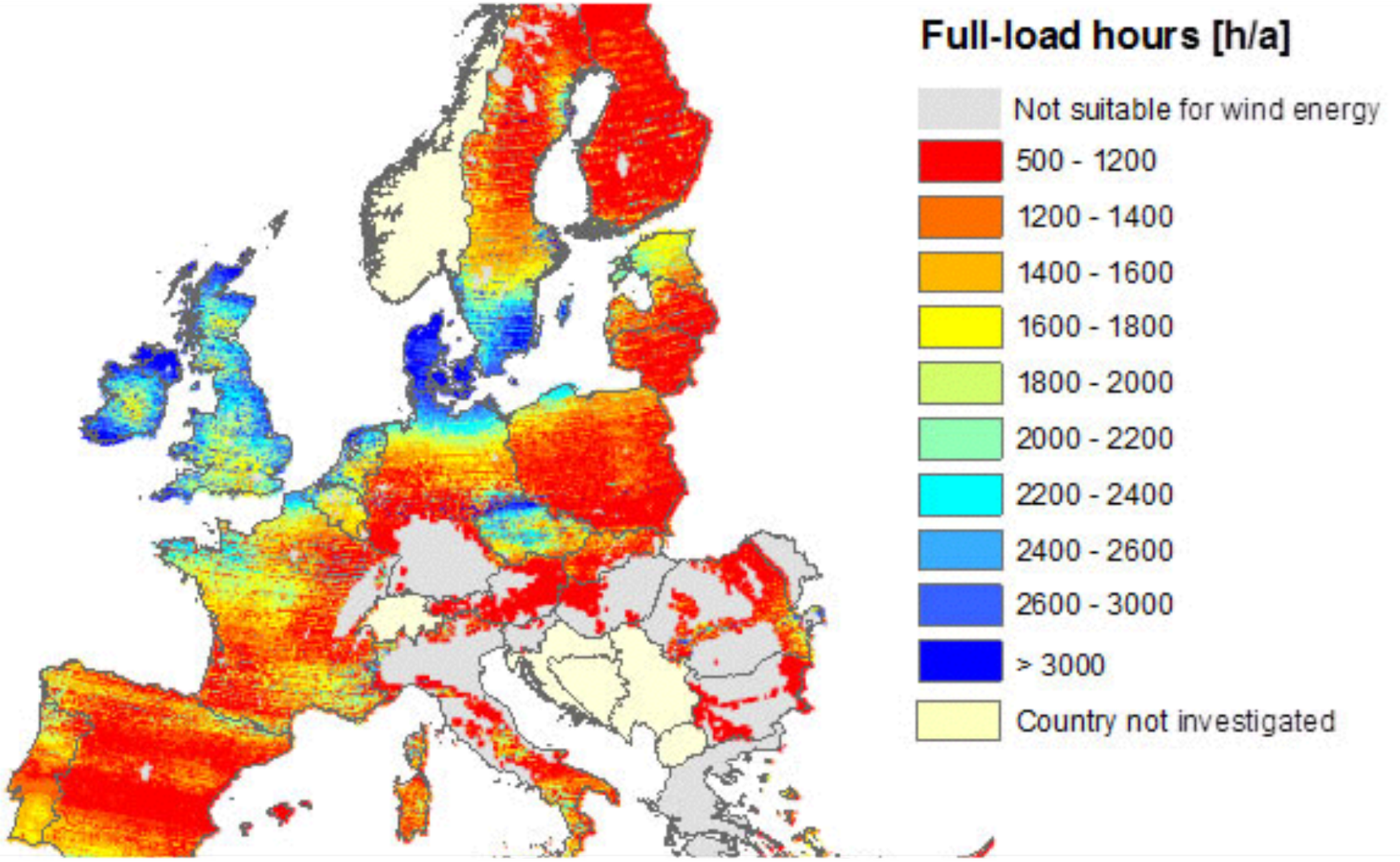
Wind power

Alternative power



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Wind power

Load hours

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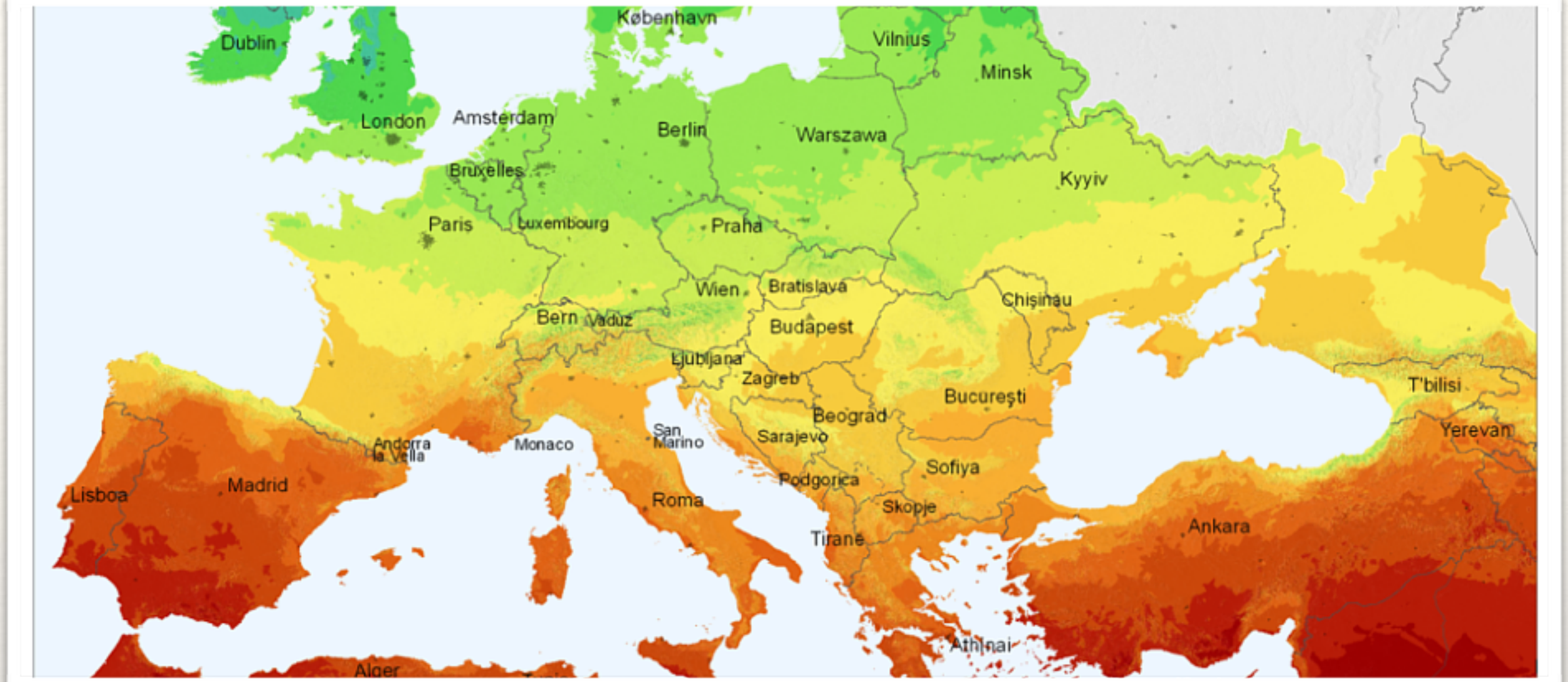
Solar power

Alternative power



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Solar power

Europe sun radiation

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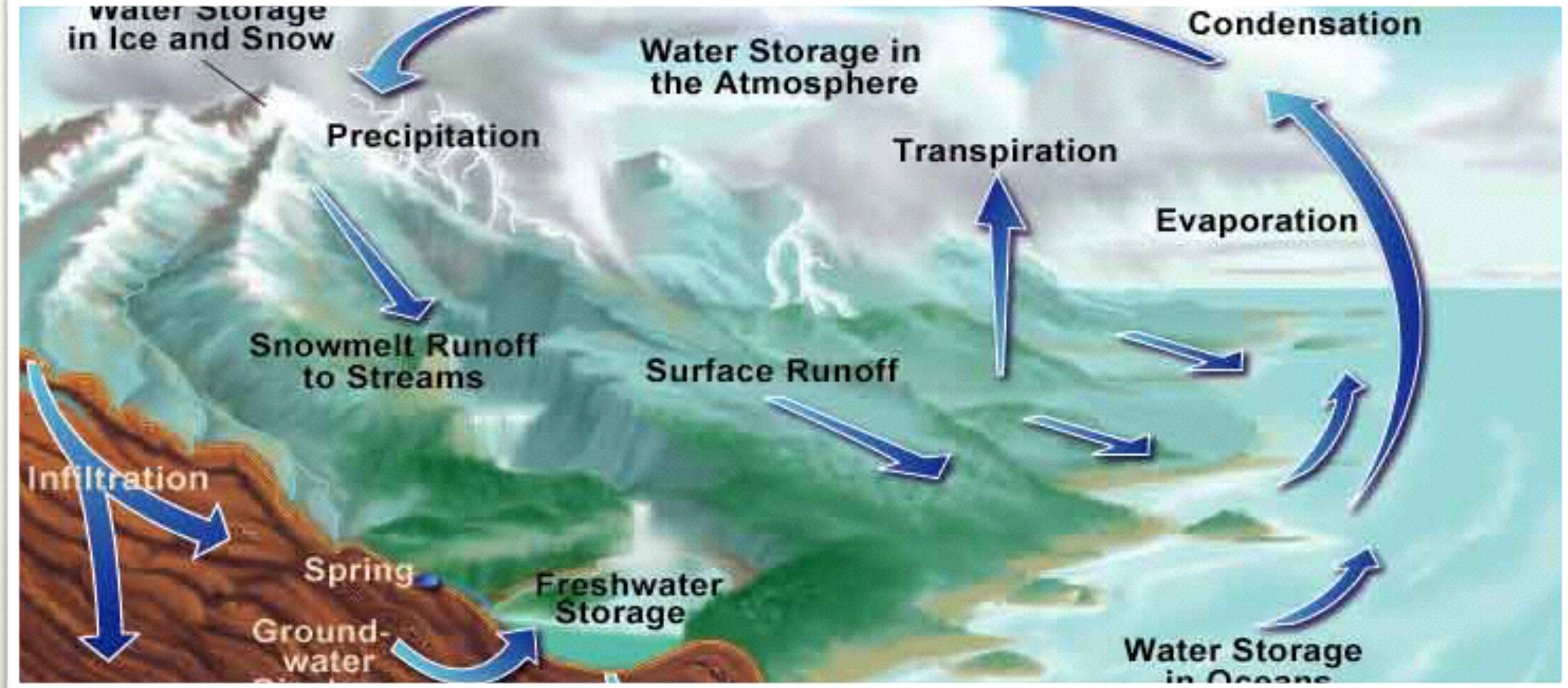
Water power

Alternative power



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Hydrology

Hydrology on installation site

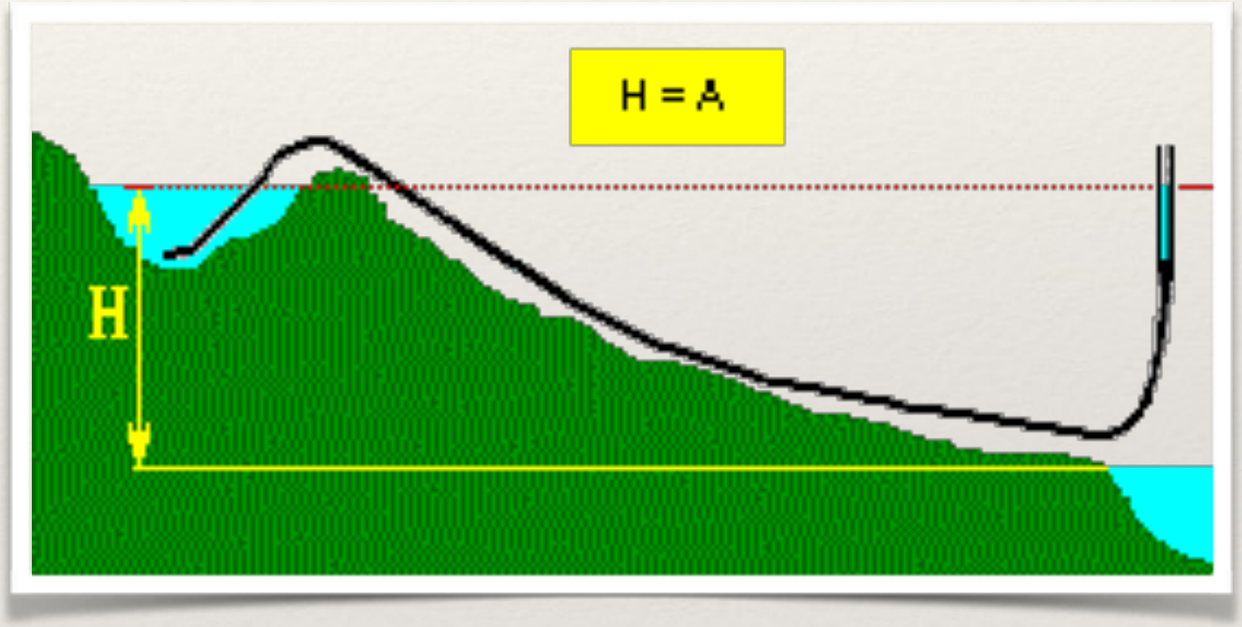
How Much water I have ?

cm	ltr / sec
3	0,2
5	0,8
6	1,2
7	1,8
8	2,6
9	3,4
10	4,5

Water energy

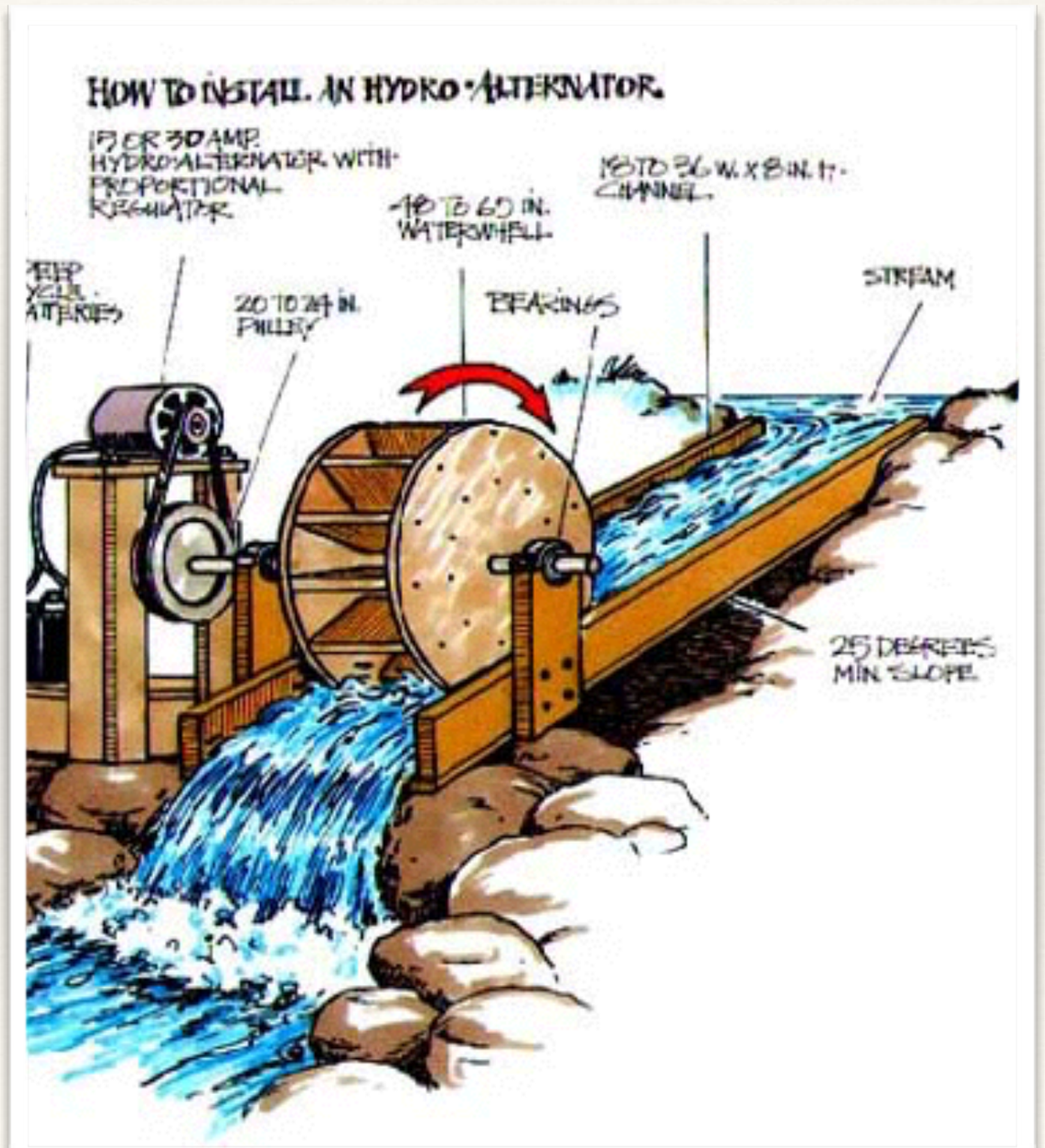
- P(watt) = 0,0981xQ(ltrsec)xH(metres)xEff(%)

75% eff	2m	4m	10m
0,8 lt/s	12W	24W	59W
1,8 lt/s	26W	53W	132W
2,6 lt/s	38W	77W	191W
4,5 lt/s	66W	132W	331W



water machines

- Water wheel
- Turbine
- other



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Water wheel

- Robust
- Difficult to steal
- non sensitive for dirty water

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Turbine

Kaplan
Banki
Pelton
Turgo
Tesla
…

Wheel or turbine ?

Engine type	10 %	20 %	30 %	40 %	50 %	60 %	70 %	80 %	90 %	100 %
Water wheel	68	75	75	75	75	75	75	75	75	75
Kaplan Turbine	15	70	85	88	90	90	90	90	88	85
Francis turbine			15	58	72	78	82	82	82	80
Banki turbine		40	60	68	72	74	75	74	72	70

Real installation

- Hydrology
  - 11m
  - 0,5 lt/ sec

Where to take a water

- Cycling preparation

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Pelton turbine

Directly connected on PM Motor

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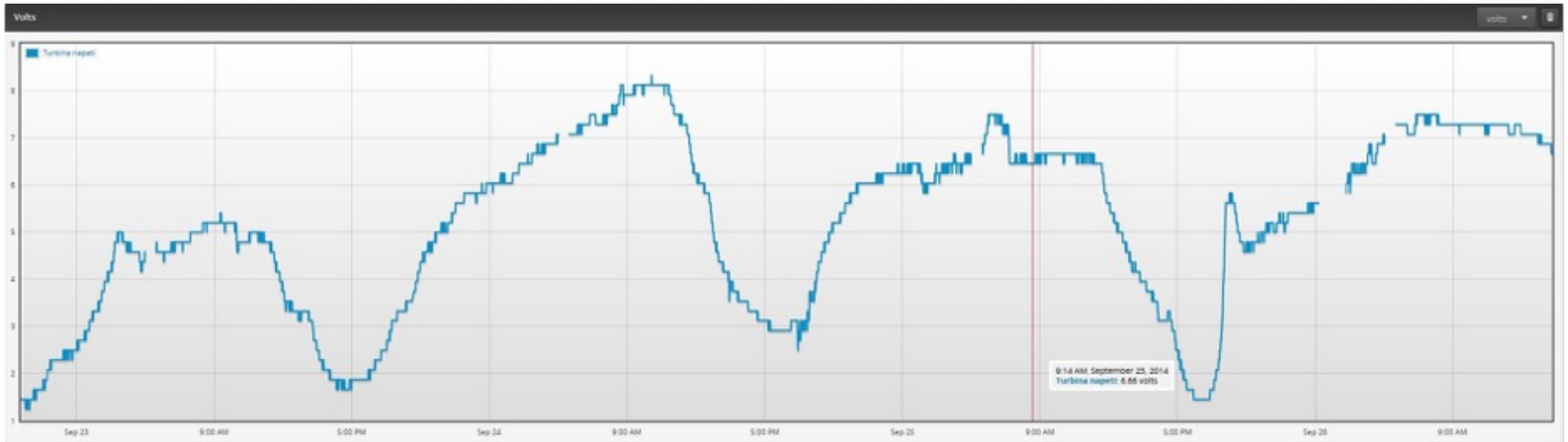
winter


- 10°C
N E S



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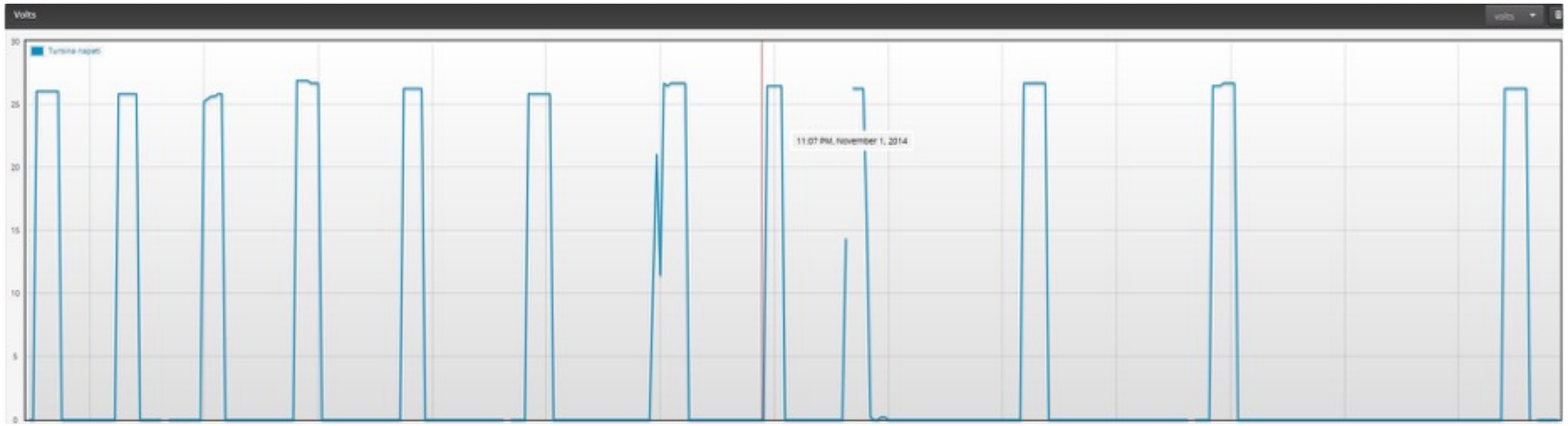
Water - real numbers

voltage from generator



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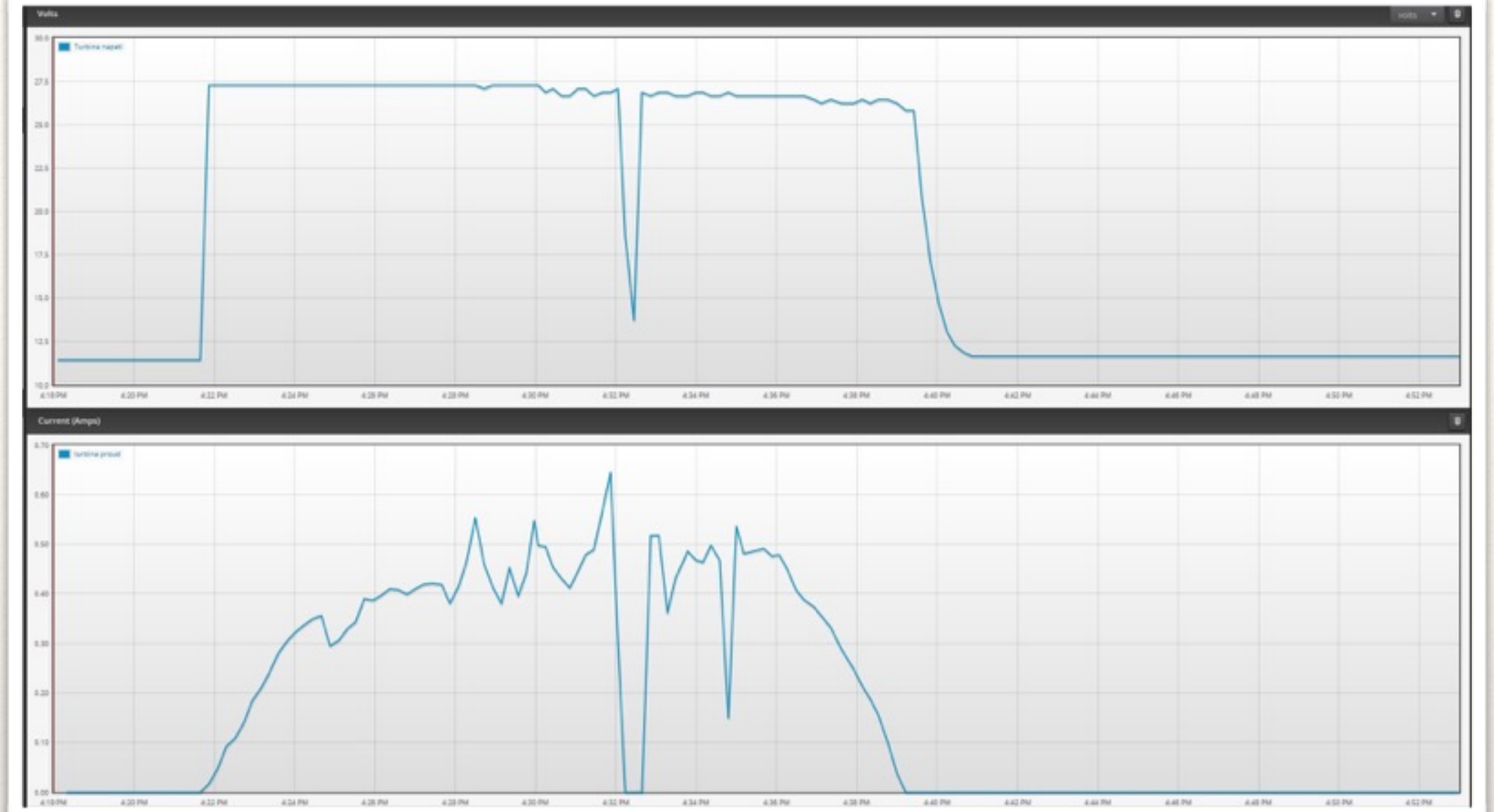
Water - real numbers

voltage from generator
Cycles



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Water - real numbers

Typical raining

27V x 0,5A = 13W

Thank you for attention

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