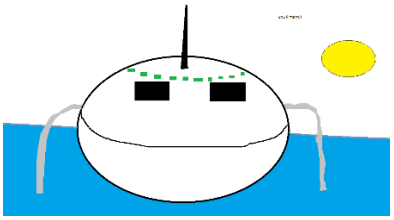

Power Consumption Estimation

A)b-l072z-lrwan

Trasmitting/Receiving Mode > consumption of Tx (38mA) and Rx (11mA)

Sleep Mode consumption 1mA (down to about 4 uA with right settings)

B) Arduino uno blackboard

With the last innovations **power consumption** of the **Arduino** Uno is reduced by 88.37% from 98.43mA to 11.45mA.

Using on-board circuit changes, selective replacement of components and the use of microcontroller sleep mode can reduce the continuous idle power usage of an Arduino UNO to only **5%** of the default draw (6 micro ampere).

C) LED

Consumption is 2mA

D) Small Solar Panel 55x70mm 0.5W.

Typical current: 100mA, Typical voltage: 5.5V

E) Lithium Ion Battery - 400mAh

F) ILS - Due bit tre vie Elettrovalvola valvola controllo elettronico Piccolo scarico valvola sfiato DC 5V DC6V

The nominal current:<60MA
The nominal power : 0.4-0.7W
Pression: 0-350mmhg
Velocità: <3S (100cc from 300mmHg to 15mmHg time)

G)

DC 3-12V Mini autoadescante Pompa ad ingranaggi Pompa di pompaggio ad acqua Pompa elettrica con motore RS-360SH,

Current 5 V - 2 A (indication not precise)
Pump motori s RS-360SH . Maximum raise 1,5 meters.

H)

AS7265x Spectrometer

UV Led 20 mA

IR LED 20 mA

White LED 30-60 mA

Operating current 5mA

Performances

1) Full Sleep mode

The performance of the whole system in sleep mode is consumption of 4 micro ampere, plus 6 micro ampere. Total 10 uA.
1.0mAh can last about 400 hours with 400 mah battery. That means more than 16 days in sleep

mode. That is making the hypothesis that battery solar recharging has not taken place for this period.

2) Normal Monitoring mode

The performance of the whole system in normal mode, making the hypotesis of 6 daily water measurements (one every 4 hours) , and real time trasmissions of data , also taking into consideration that we must enclose in this calculation 6 pump water loads, and 6 pump water drains, and also consumption of 10 LEDs for nocturne buoy visibility, is :

Consumption

6 x Tx (38mA) x 2 sec	2b-1072z-lrwan
11.45mA x 24 hours	BlackBoard Arduino board
6x2 x 20mA x 1 sec	2 LED AS7265x
6x1 x 45mA x 1 sec	1 LED AS7265x
5 mA x 24 hours	operating current AS7265x

6 x 2A x 10 sec	pump loading water
6 x 60mA x 10 sec	pump drain water
10 x 2mA x 6/2 hours	Buoy Night Leds

Power (Watt) = voltage (volt) x current (Ampere)
Power (Watt) = 3.3 v x current (Ampere)

3.3 v x 6 x Tx (38mA) x 2 sec
3.3 v x 11.45mA x 24 hours
3.3 v x 6x2 x 20mA x 1 sec
3.3 v x 6x1 x 45mA x 1 sec
3.3 v x 5 mA x 24 hours
3.3 v x 6 x 2A x 10 sec
3.3 v x 6 x 60mA x 10 sec
3.3 v x 10 x 2mA x 6/2 hours

3600 sec x 24 = 86400 sec
1 sec = 1 day/ 86400 = 0.00001157407
1 sec = 1 hour/ 3600 = 0.00027777777
Daily consumption in normal mode

76 mA x 0.00001157407= 0.00087962932 mAday

	989280 mAday
240 mA x 0.00001157407 =	0.0027777768 mAday
270 mA x 0.00001157407 =	0.003125 mAday
	432000 mAday
	1.388888 mAday
	0.041666 mAday
	2.5 mAday

	0.395 A / day

That is total consumption of 3.3 v x 0.395 A = 1.30 watt / day

Capacity Planning

It seems that they will be necessary 4 solar panels and 4 lithium ion battery for the actual normal mode.