From Water To Energy

Student: Kevin Meyer

Teacher: Vicente Guallart

Institut Of Advanced Architecture

How can we generate energy from water

In 1880 the first blade wheel was build to be set on a big river to produce electricity
Nowadays
« The hydroelectric power comes from the potential energy of dammed water driving a water turbine and generator. The power extracted from the water depends on the volume and on the difference in height between the source and the water's outflow. This height difference is called the head. A large pipe (the « penstock») delivers water from the reservoir to the turbine. »

So that means there is two important information :

- the hight that the water will go through

- the amount of water



Blade wheel



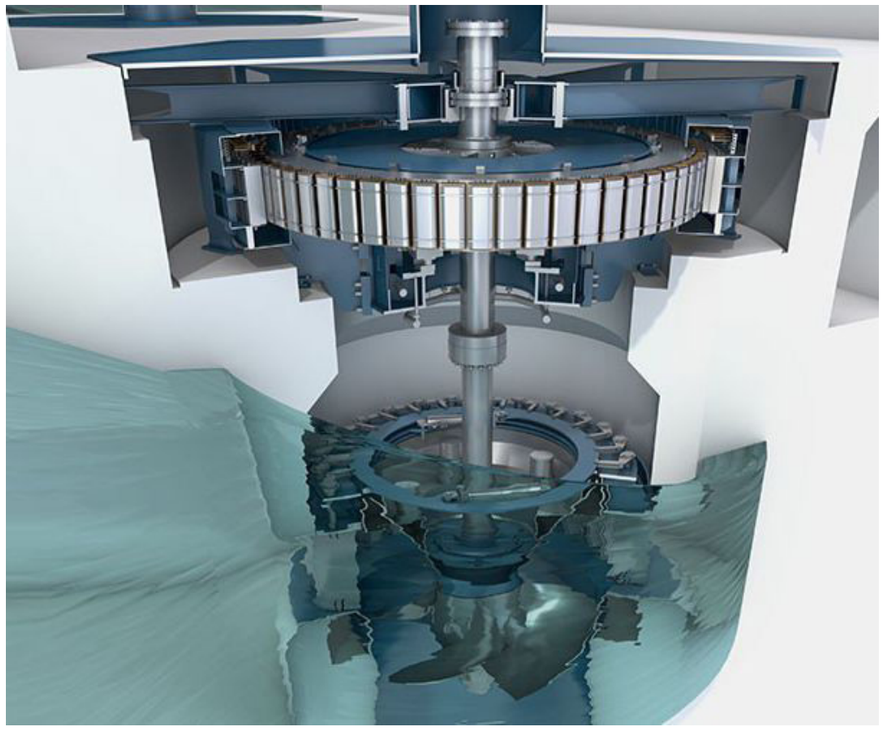
Water turbine



River barrier

Different type of turbine

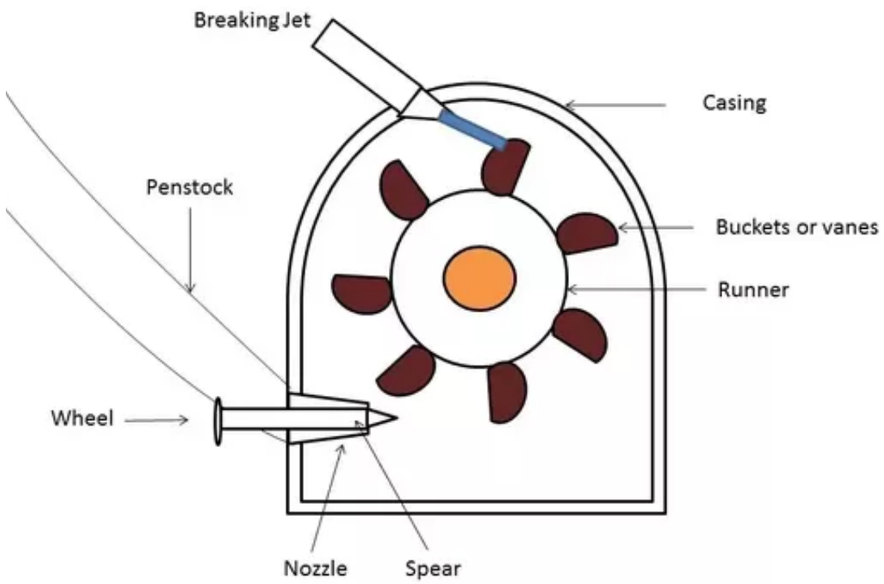
Kaplan turbine



Vortex without blade turbine



Tempelton turbine



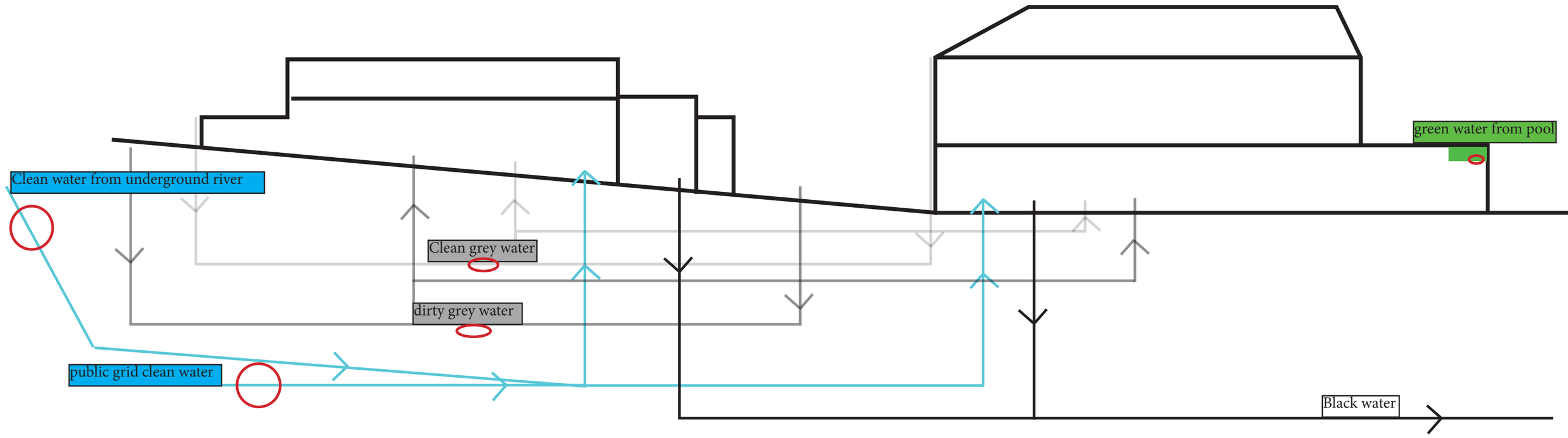
Water bladeless turbine



Valdaura water schema

- Clean water from the grid
- Clean grey water from roof collector
- Dirty grey water from the soil
- Black water from flash

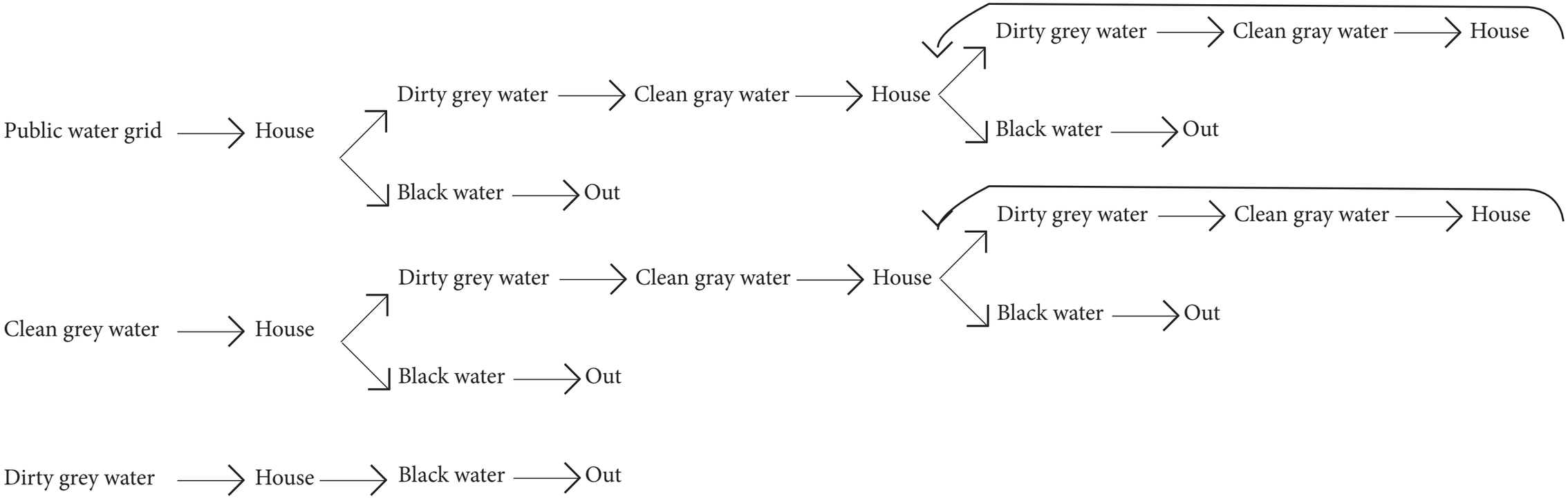
- Possible turbine place



How the different type of water works

In Valadaura the water system is
divided in 4 different kinf of water.

- Clean water from the grid
- Clean grey water from roof collector
- Dirty grey water from the soil
- Black water from flash

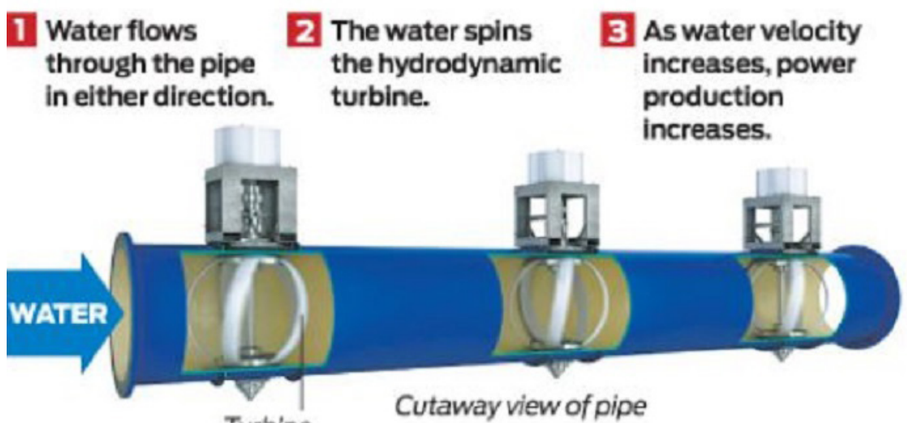


State of the art

Today we are trying to be able to produce energy from the water that we use in the bulding.
The main probleme is the amount of water that we can use.
The goal is to scale a machine build to be used with a small amont of water to a device that can also produce energy.
To use for example a kaplan turbine we need a least 10 l/s to be able to produce something.

With the new turbine we are now close to 0.1 l/s but still amount of water.

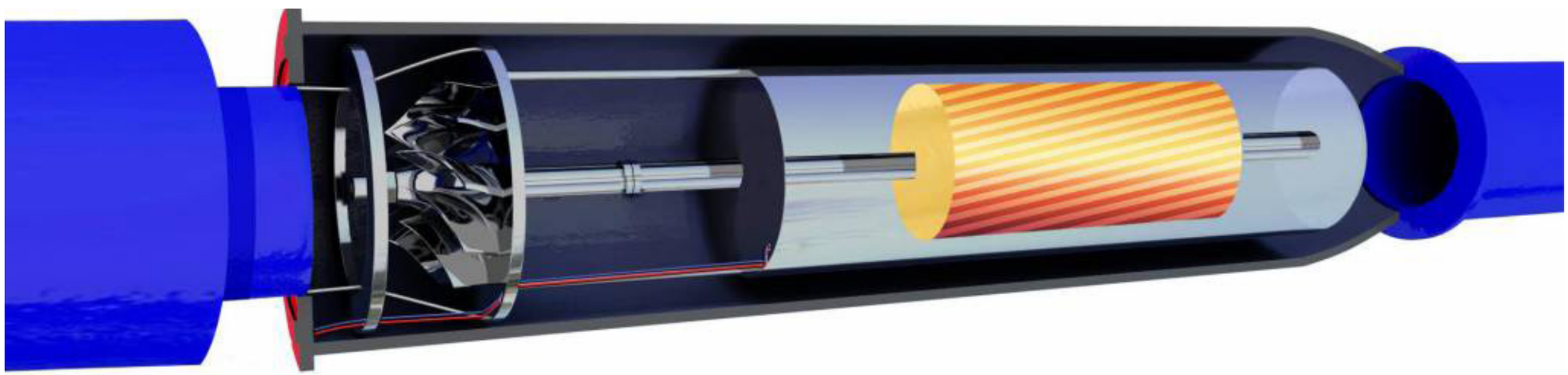
1990 Energy produce from water grid in Switzerland



2015 Vortex bladeless turbine. Best invention 2015



2017 Hydrowatt and Saint-Gobain PAM



How collect data from a pipe or a small river

What i learnd is that there is small mine river in Valdaura.
So maybe i use this water to create energy this can be a good solution.

Or we can create energy from the house water and use it to pump that water to the buldings.

In any case what is needed it's data. Amount of water, speed, hight difference.

To collect them there is differente solution.

The first one is if we know how deep is the river in any points and how large the river is, this can be done by hands but still note accurate but gives you a good idea

The second one is using a sensor. Cambell Scientific create sensor for rivers

Cambell Scientifics CS450 water sensor



Data sheet

Valdaura water consumssion			
kind of water	used water/ years	water coming from recycle	wasted water
clean water			
clean grey water			
dirty grey water			
black water			
pool water			

DATA					
Device	min # of water l/s	min power generated w/h		power generated according to amount of water	heat creation
Turbine cliford	10	3000			
turbine kaplan	100	3500			
vortex turbine	0.1	55			
turbin without blade	0.1	35			
amount of energy to run the pump		350			

What is next

- how much water, how much energy can i produce ?

- for what use ? run a pump, used for heating and colling or the produce and save energy somewhere ?

- find wich device to use ? Vortex bladeless, turbine inside a pipe ?

- find the utility ? run a pump , used for heating and colling ?

- test the device

- optimize the device

- apply it