



HOME WATER

EXPLORING A NEW DOMESTIC WATER OPTIMIZATION SYSTEM

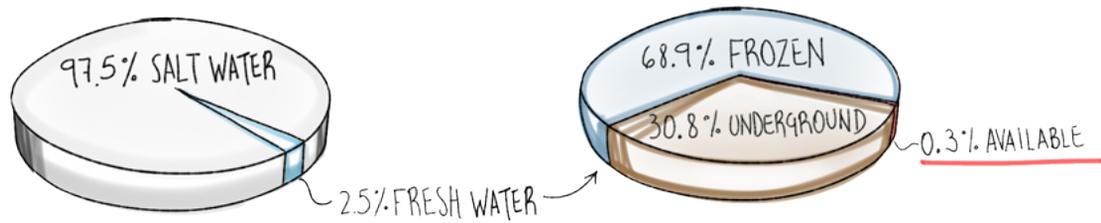
INTRODUCTION



This project was born from the importance that water has in our living environment and how its misuse is putting in danger the planet ecosystem and possibly our future generations' wellbeing. This document begins by briefly introducing the importance of water as a key element to create and sustain life in our planet. Following this first water general background introduction, a collection of different insights are pointed out in their appropriate context to provide an inspiring canvas for ideation and concept development. By addressing these insights the concept of 'Home Water' is developed to emphasize how water use and supply could start to be better understood and consciously applied in a close future scenario. Home Water also includes a cost overview. This compares our water concept proposal approximation cost with the current and future scenario of house expenses within a household. Finally this document finishes by emphasizing the winning points of our concept.

*"It is time to speak out
and to act when the life-
giving water is pervasively
and systematically under
threat".*





LIFE IS WATER

Water is a natural and fundamental resource for life development in the planet, all living organisms are at least composed by 50% of water. Humans, for example, are made of around 80% of water while insects are mainly between 60-and 70% of live weight. Water is also a critical natural resource used in many human activities. Although water is abundant in our planet, fresh water is actually scarce. This is replenished through an evaporation process which mainly comes from oceans.

Considering that planet Earth surface is covered by 70% of water, it doesn't seem that there should be any problem of water shortage. However 97.5% of the total water amount comes from oceans and seas and has high sales concentration. In other words, the small portion remaining 2.5% is what is known as freshwater. Freshwater resources provide a wide range of goods such as drinking water, irrigation water, and it is the pillar for maintaining food

security, livelihoods, industrial growth, and environmental sustainability throughout the world. Unfortunately, 68.9% of it is contained in polar caps and, and therefore frozen. 30.8% is found underground and although it is in perfectly drinkable, it is difficult to access. This comes down to only 0.3% available for us, and it is mainly retrieved from rivers and lakes.

The above-right figure shows the total existing water in Earth, making difference between salt water and fresh water. In exchange, the figure that appears top-left illustrates the distribution of freshwater.

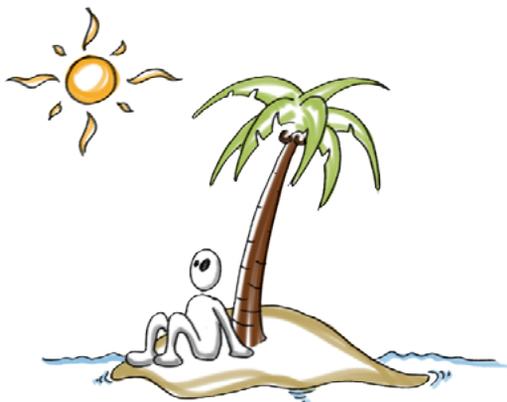
“Access to freshwater supplies is becoming an urgent matter across the planet”

CONTEXT & INSIGHTS



ISLANDS

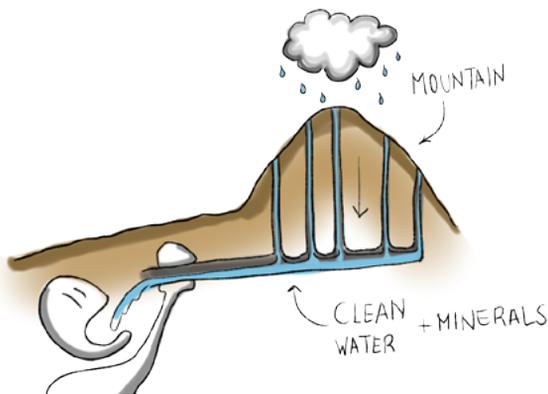
Water scarcity is hitting almost all spots in our planet. Small islands, like Balearic Island (Spain), seem to be especially sensitive to experience more problems due to their natural composition. This is mainly happening because they are basically surrounded by water, and when it rains, there are no means to collect the water rapidly goes back to the sea. They usually lack on rivers or lakes. Furthermore those rivers appear during some parts of the year completely dried. This situation asks for simple but functional solutions of how water could be more efficiently recollected and used for households.



RAINWATER LOSS

Rain water is almost ready to be consumed (mineralization is needed), and it is naturally often to us. Unfortunately much of this water is directly not collected and therefore lost. All rain we have in the cities, although is inevitably used for watering our gardens for example, is usually perceived as something annoying and counter-productive in our daily life. Even in periods of drought is not positively perceived since rain in the cities doesn't contribute to have more water reservoirs. The idea of raining in the cities needs to be changes and start to be considered as something useful.

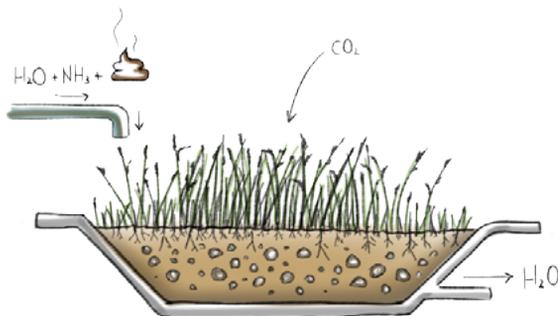




NATURAL PROCESS OF WATER

The natural process of water is an incredible source of inspiration for concept generation. If we generally observe the complete water cycle, we can see that only underground water is perfectly clean and mineral enriched to be consumed. Underground water acquires its unique quality through being filtered by the ground itself, this process mineralizes the water while being cleaned.

Wetlands is another interesting natural factor in which we laid our attention on. Wetlands have a special ecosystem based on different kind of bacteria which are able to purify water which is later on filtered. In fact wet lands are already being under research and used to clean waste from livestock.



WATER MISUSE

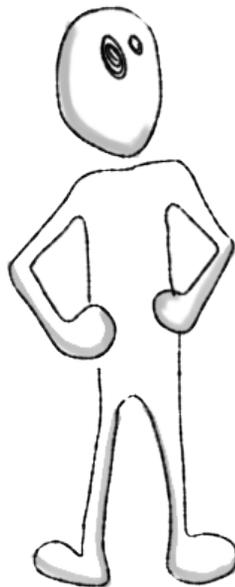
Domestic water is increasing, nowadays we consume five times more water than 40 years ago. Besides this increase, it is surprising to see that only 4% of the water we use at home is actually drunk, and sadly 23% of it is flushed down the toilet. Other interesting figures are the shower which represents the 37% or the 20% used in the bathroom (excluding shower and toilet). That drives to think drinkable is not actually used in all house outlets and therefore not needed. Would it be possible to have different quality water in consideration to what is actually used/needed?

“In average every year a person flushes down the toilet almost 10,000 litres of drinkable water”



PEOPLE ARE BECOMING ENVIRONMENTALLY CONCERNED

Interestingly people are nowadays much more sensitive to make small efforts or to show that they care about the environment. We can clearly observe people separating waste for recycling or showing in social media that they make efforts in favor of the environment. That provides new opportunities to create innovative water solutions which before were considered to have no value at all, and are now perceived positively different. Therefore, there is a huge opportunity to take this scenario and capitalize it in an engaging new trend for water consumption solutions.



HOME WATER



HOME WATER INTRO

Home water consumption represents the 20% of the total water consumption and despite it is drinkable in many countries, only 4% is actually used for that purpose. The concept of Home Water aims to counteract the continuous increase of domestic water consumption without interrupting people lifestyles. This concept proposes a solution to supply water to a household by only using rainwater. Home Water system reduces the final volume of water consumption and use the hydrological cycle more efficiently. This is achieved through first rainwater collection, and followed by appropriate treatment of various stages of bionic forms. This solution hardly depends on usual water supply and proposes different water qualities for different purposes.

Changing human mentality of water use is a 'must' issue which needs to be addressed in the future. Home Water can contribute to this cause by highlighting those households which actually use this system. Our values are based on increasing awareness of using drinkables water for activities which actually don't need it, drinkable water is understood as something valuable and appreciated.

THINKING PRINCIPLE

Different water outlets within households are used for different purposes. Most people would not even remember when was the last time they drank from the garden hose, however this is drinkable water which we usually use (waste) to simply garden our plants or clean our terrace.

Home Water looks closely to determine which quality of water is needed for every use. This has been executed without adulterating the Spanish law for water use in households (Real Decreto 140/2003). Even when we hope that this law could be modified and become more water sensitive, for now we have developed this proposal within its boundaries.

*“A household of four
people consume around
two Olympic swimming
pools per year”*



HOUSEHOLD WATER CONSUMPTION

Domestic water use goes up to 20% of total water consumption; however we believe this sector appears to be less optimized in comparison with industry and agriculture and therefore it might yield great room for optimization.

Assuming no water is used to gardening, a Spanish person consumes an average of 120 liters of water per day. 35% of it is destined for the shower, 20% use the sink and bidet, and 25 % is for the toilet, all of these water points-of-use provide water with a higher quality than necessary. The remaining 20% is destined for cooking and cleaning, and drinking which only represents the 4%. If the consumer has garden, the consumption becomes much higher, a green area of 100m² needs around 300 l of water per

day, amount equivalent to 7 showers.

Currently humans consume water inside your home at various points of consumption depending on the intended use. However regardless of the use, we always obtain potable water. Given that all points-of-use require high water quality, once the water has been consumed, it goes directly into the sewage system.

“Only 4% of the total domestic water is actually ingested”

HOME WATER SYSTEM

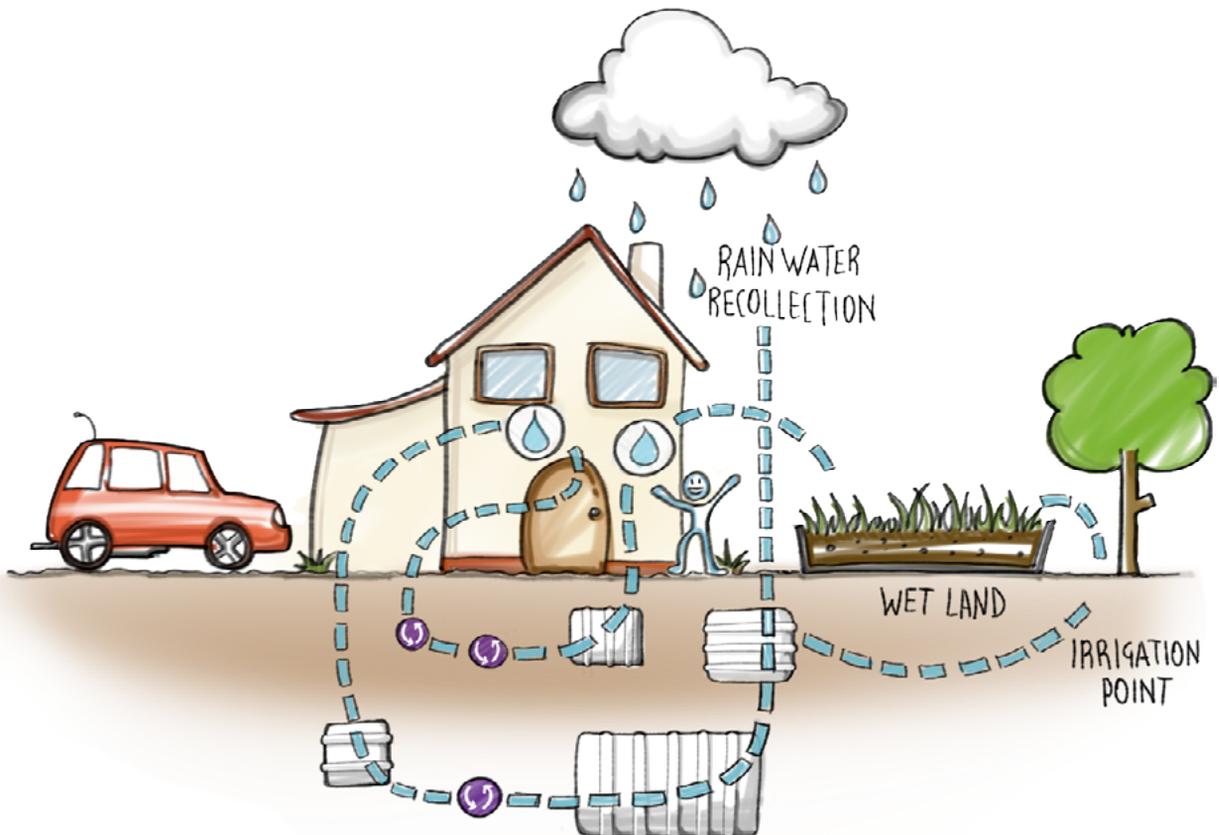
Rain water rushes over the house's roof and flows to the lowest point, where it is collected and kept into the rainwater tank. Previous to this initial stage, the first liters of rain are diverged to another tank, these first-flush appears to be more contaminated due to pollution and organic matter accumulated on the roof. First-flush water is used for irrigation only. Once the water is collected, it is treated and then directly led to the drinkable water tank. The water is pumped back to the household to be used for drinking, shower or cooking. After being used, this water is again collected and treated for second use purposes which are washer machine, dishwasher or toilet

amongst others. All consumed water is finally directed to a wet land in which it is purified and later on used for irrigation purposes. The following pages provide the information of this process in detail.

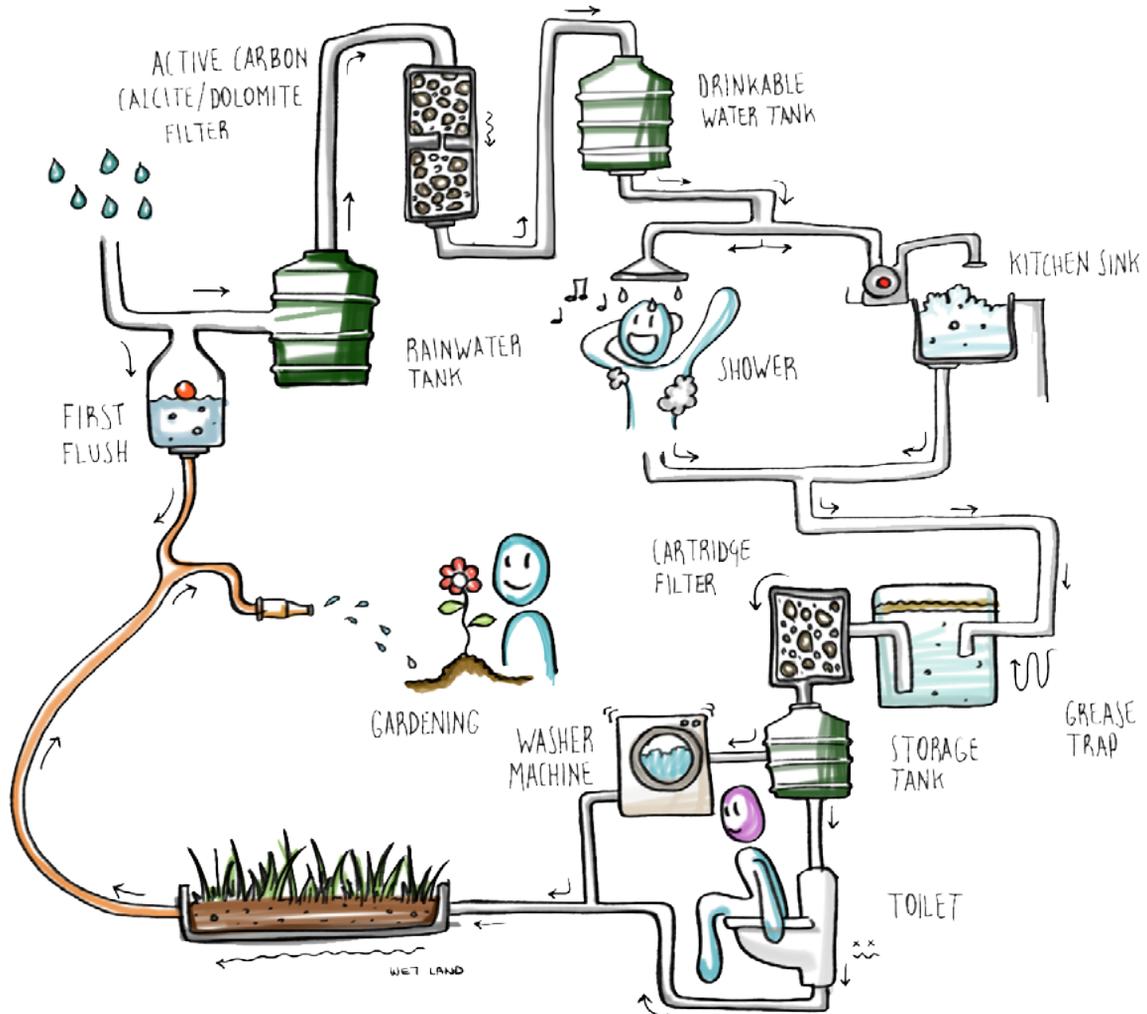
 Water Consumption

 Water Treatment

 Water Tank



HOME WATER PROCESS



Rain Water carries atmosphere gases (mostly CO₂) and grabs organic material from the roof.

First-Flush gathers the first 300 L rained, since it is the most polluted volume. Once filled, the rest of water goes to the rain tank. This first-flush water goes directly to irrigation.

Rain tank accumulates rainwater where sodium hypochlorite needs to be dosed to avoid biologicals development.

Active carbon + calcite/dolomite filters retain polluted particles and provide mineral salts in order to make water drinkable

Drinkable water tank accumulates water ready for consumption.

Drinkable water is used for the shower, washbasin, bidet and kitchen sink.

Grease trap retains greases produced in prior consumptions and light particles.

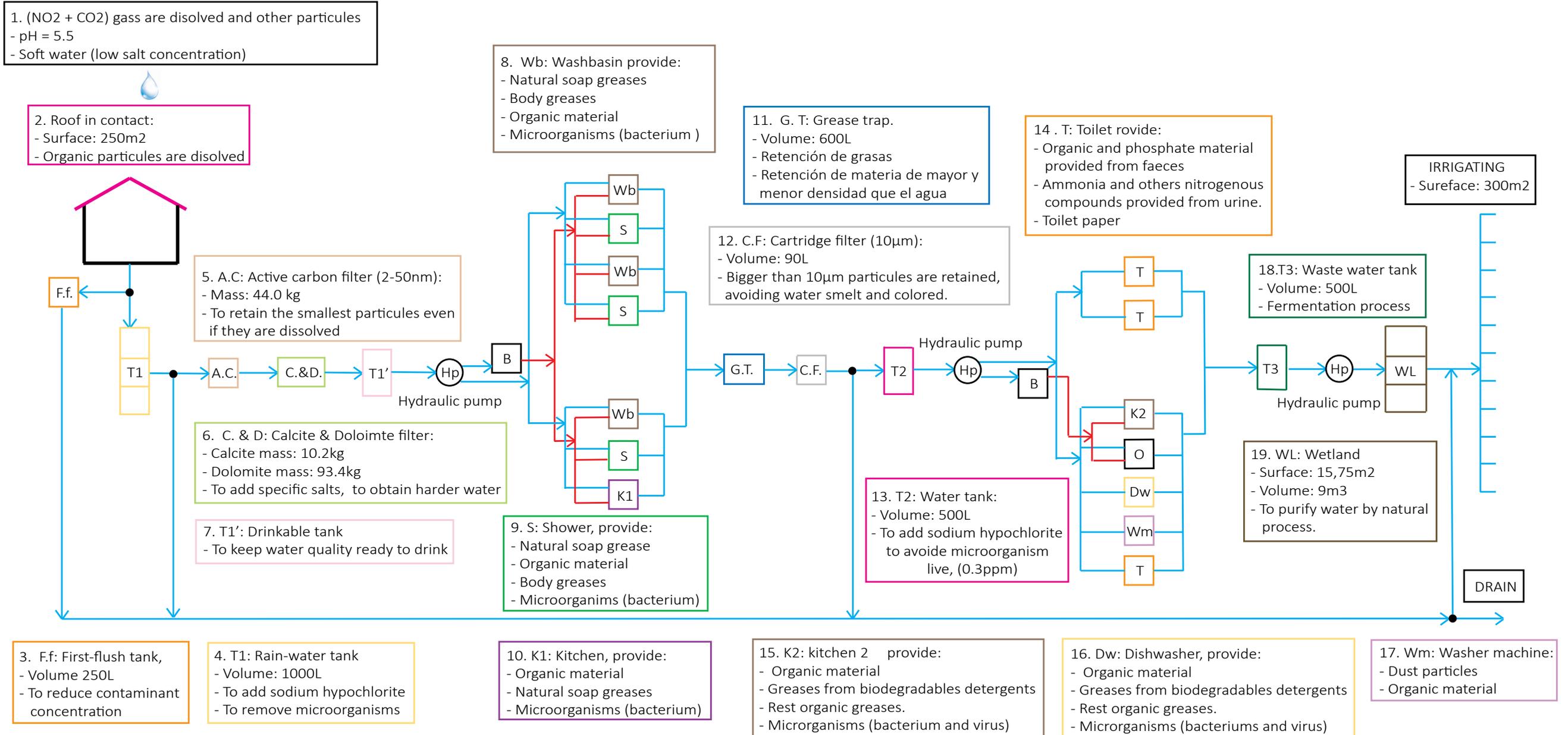
Cartridge filter retains small particles to avoid smell and colored water.

Accumulator tank stores the water for second uses. Sodium hypochlorite is added in a 0,3 ppm concentration. Sodium hypochlorite is reduced because it oxidize due to the presence of organic matter mixed in water.

Artificial wetland is an area where waste water will be purify by natural system by the use of physics, chemistry and biology changes.

HOME WATER TECHNICAL DETAILS DEFINITION

This section provides a detailed explanation of all water treatments as well as all different devices and mechanisms needed in this process. All definitions have been calculated for the following specific situation. This example consists of a house with 250m² of slopping roof and 300m² of garden which has been designed for four users with the possible sporadically addition of a fifth.



COSTS



CREATING A SCENARIO

This section shows an economic balance of the presented concept. Since it would be highly variable depending on which household it is installed, we will present these costs in the same example we have used for the technical description. In order to provide real results an evaluation of the prices evolution from the past to now has been executed and applied for a future scenario generation.

The example consists of a house with 250m² of slopping roof and 300m² of garden. This house has been designed for four users with the possible sporadically addition of a fifth.

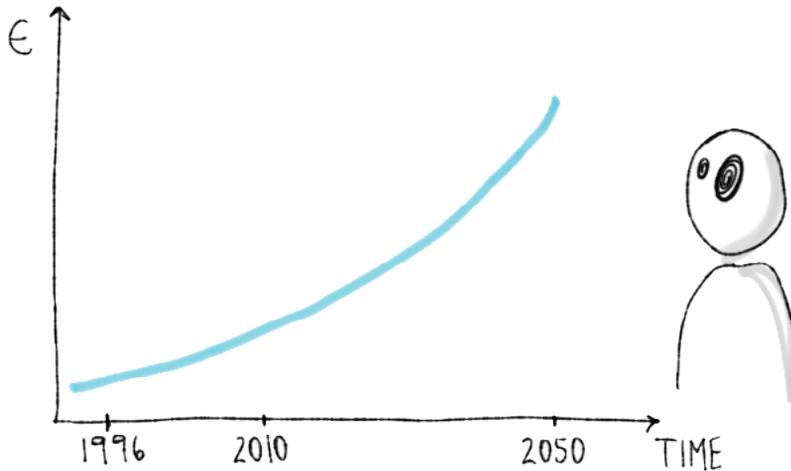
COMPARISON

This section shows Home Water from the economic point of view. Since the expenses would be highly variable depending on which household it is installed, the example used for the technical description is also applied in here. Moreover, in order to provide a proper economic estimation, the evolution of the prices of the recent years has been taken into account to generate a realistic future scenario situation.

The example, as it was described before, consists of a house with 250m² of slopping roof and 300m² of garden. This house has been designed for four users with the possible sporadically addition of a fifth.

In Spain, especially in recent years, the price of water has significantly increased. In 1996, the previously exposed housing would have a monthly expense of 52 €, while for 2010 would have risen up to 125 €. These values drive to an increase of around 6% yearly and serve as reference for future consumption expected over the

WATER CONSUMPTION PRICES



coming years. All products and energy used in Home Water system have an increase of a 2.5% (the increase of the energy for pumping the water is also 2.5% since it is almost negligible).

Currently a conventional water system, considering the house example provided, would cost around 12,000€, while the installation of Home Water would approximately amount 60,000€. However, the consumption of water (service + consumption) goes up to a value close to € 140 per month, while Home Water costs (system maintenance such as active carbon, dolomite, calcite etc. and energetic consumption from the pumps) would amount to a value of € 50 per month. Taking into account the rise in the cost of water supply and disposal, in 2025 the conventional consumption of water would amount to 285 € / month, and it would

arrive to 1,200€ / month by 2050. Home Water could cost 75 € / month in 2025 and 112.5 € / month by 2050.

As it has shown above Home water provides benefits every month. To know how much this is in a medium and short term future, the total cost has been calculated for 2025 and 2050. In 2025 The Normal Home spends 61,600€ while Home Water spends 43,800€. However, by 2050 the Normal Home amounts 241,100€ while Home Water is 63,900€. Providing a benefit of 177,200€.

“Considering the dramatic increase of water prices, by 2050 Home Water could provide a great economic benefit”

* Although water consumption per capita is increasing, we think it is unpredictable to foresee water consumption in the future, therefore it has not been considered.

* A m3 in 1996 cost 1.26€ while in 2010 was 3.02€.

ADDED VALUE



INTRODUCTION

This section explain the winning aspects of this concept proposal, we invite the reader to believe 'Home Water' can start to be perceived as something more than just reusing water at your home.

“Home Water has the potential to be adapted to other scenarios, from Hotels and restautants to even isolaed shelters”

OPTIMIZATION POSSIBILITIES & FLEXIBILITY

This concept has been developed and presented in this document as a solution for a household. However this system is sensitive to be scaled up to be more efficient and to offer a myriad of applications. It allows the generation of new building concepts in which all buildings surround a green spot which provides fresh air to the neighborhood and at the same time provides a perfect environment to raise a family. Another example is the incorporation of Home Water in hotels or restaurant in which consumers could feel identified with the healthy values of the place. These are simply a couple of examples of how the potential of Home Water; we believe there are endless opportunities in which this system could be applied.



HOME WATER SEAL

Building on the optimization possibilities and flexibility Home Water offers, and considering it is a new way of thinking and interacting with rain, a 'seal' could be generated. Nowadays, besides an exception of great architects, no building is under any trend or brand. 'Home Water' holds healthy values, and looks ahead for a healthier and better society, and we believe this needs to be communicated to the outer world. Therefore we propose to generate a seal as a mean to communicate all values Home Water stands for. This seal could be accompanied with an economic subsidy in case of a household. It also could improve the perception of a restaurant, hotel or public building, which somehow could start creating the concept of 'Home Water is inhabited by water friendly people'.

CREATING AWARENESS

The concept of 'Home Water Seal' is applied can contribute to raise awareness of current and future water issues. Perhaps some people can't have this system because of different reasons such as economic, living in a renting house or the house's infrastructure. However by seeing water friendly messages, people can become aware of the sensitive moment water is going through and start taking more care of their domestic water use.



HOME WATER

PEOPLE ALWAYS GATHER AROUND WATER,
WE GATHER WATER AROUND PEOPLE.