AquaSense

Be Smart About Your Water

Business Plan
SI480

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AquaSense Business Plan

I. COMPANY OVERVIEW

AquaSense is a wireless water flow sensor that measures total water flow into a user's home or business. This flow data is presented to the user by an intelligent mobile application. The AquaSense system helps consumers living in regions with drought or expensive water closely track their water use and save money. AquaSense can also alert users to abnormally high flow that could come from potentially disastrous leaks. AquaSense is an affordable, easy-to-use product that is an early entrant in a rapidly growing water market.

II. PROBLEM AND OPPORTUNITY

Water has become alarmingly scarce in California and much of the western United States. Water "rationing" is in effect and homeowners are being asked to limit their water use. Water is also increasingly expensive in areas with or without drought, as municipalities try to capitalize on utilities. It is challenging for people to develop good water use habits if they cannot quantify how much water they are using in real time. A homeowner only discovers how much water he has used (and how much it cost) after receiving the bill at the end of the month. If a homeowner was aware of his water usage on a real-time basis, he could change his habits *before* it costs him money.

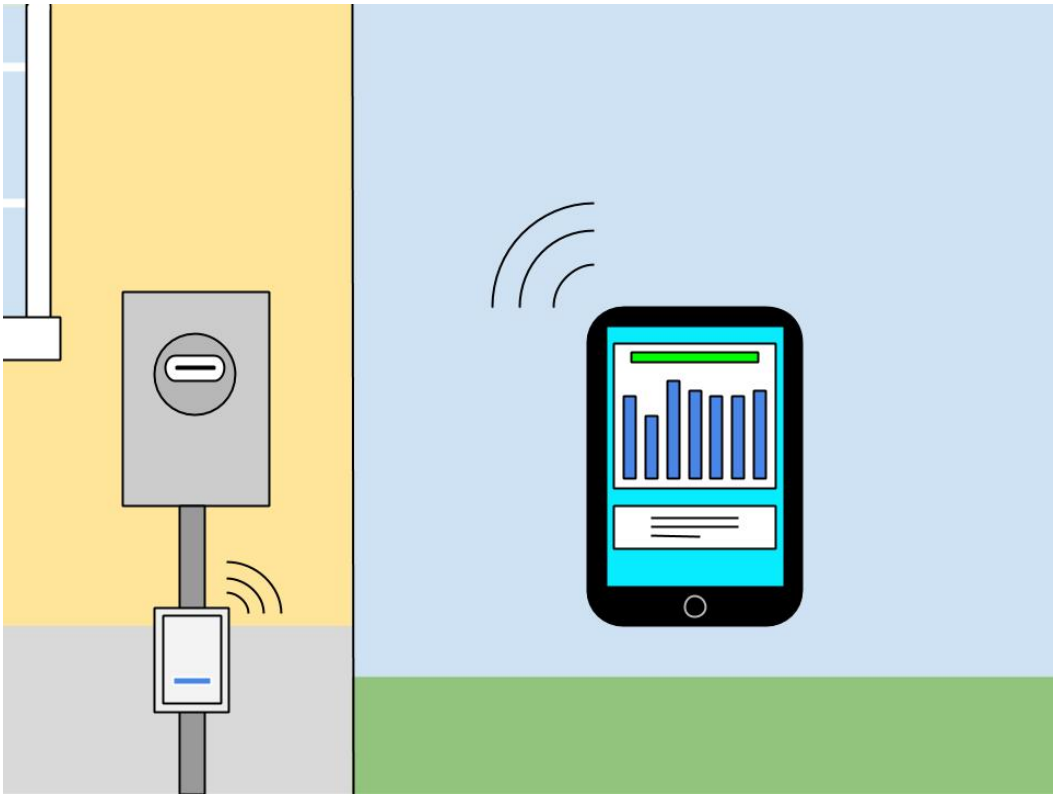
There is also growing concern about the environment and sustainability. People are becoming increasingly conscious of their water use but have few ways to keeping track of it.

III. OUR SOLUTION

Overview:

The AquaSense system comes in two parts:

1. A small, wireless sensor box that attaches directly to the home's water inlet
2. An intelligent mobile application that presents real-time data and alerts to the user



AquaSense uses ultrasonic (rather than mechanical) sensors to measure water flow, meaning the sensor box can be attached directly to the pipe without cutting into it. The box straps to the pipe with simple industrial strength zip ties. Since no cutting or tools are required, installation can be performed by the homeowner instead of a professional.

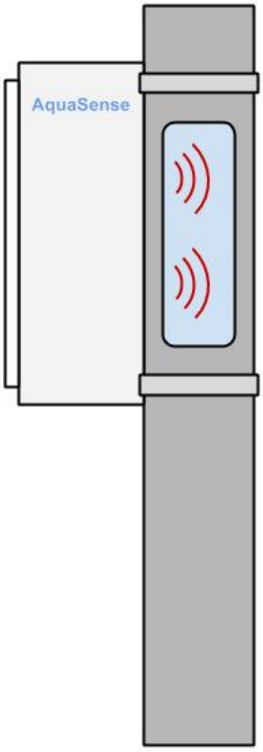
Once installed, the sensor box connects to the homeowner's wireless network, streaming real time flow data to our service in the cloud. Our sensor box is relatively low tech. It simply collects water flow data and transmits data over wifi to our service. This lets us keep the cost and power usage of the sensor box low. Most of the data processing and analytics takes places on our web service. This data is then streamed to the user's mobile device.

Users can set daily targets for water usage. These targets stem from monthly goals like**:**

"I want to spend less than $xxx per month on water"
"I want to use less than xxx gallons of water each day"

As the day progresses, AquaSense alerts homeowners when they are nearing their set limits. Users can track water usage on an hourly, daily, or monthly basis to look for trends and potentially adjust their water use habits. With access to real time data, homeowners can better estimate their monthly water costs and easily see the benefits of conservative water use.

The Ultrasonic Technology:



Ultrasonic sensors measure water flow by detecting the speed of particles in the water. If the diameter of the pipe is known, water flow can be measured with a high degree of accuracy. Once installed, AquaSense first measures the diameter of the pipe to calibrate the sensors. The sensor box then takes periodic measurements of water flow.

Possible Installation Locations:

If the home has:

a. A water meter attached to exterior of house
b. A water meter accessible under the kitchen sink
c. A water meter in the basement

AquaSense can be attached directly to the pipe that feeds the water meter. This places the sensor box inside the house or directly on the exterior of the home. The sensor box performs equally well indoors or outdoors.

If the home has:

a. A water meter underground, usually near the curb
b. No water meter (water comes from a well)

AquaSense can be attached to the main water pipe that enters the home, usually in the basement. This places the sensor box exclusively inside the home.

Installation Guidance:

We will provide an installation guide with each AquaSense package. Video tutorials will also be available on our website. Customers can call or email us with questions and receive personalized installation guidance. Customers can also contact their local water provider, who will know where their water meter is located.

Wireless Signal Range:

Our sensor box will always be located inside or on the exterior wall of the home. This is within range of most wireless networks. Typical home Wifi networks have a range of 100+ feet indoors and 300+ feet outdoors. Our box needs only minimal connectivity to send water usage data (kB/sec strength rather than MB/sec) and can thus deal with inconsistent or poor wifi coverage. If water flow is low or doesn't change (for example, late at night) we will send data less frequently to conserve power.

The Mobile Application:

The mobile application presents water use data to the user by showing daily, weekly, or monthly trends. The application will also show in real time how much money users are spending on water and how much money they are saving by altering their habits. Location services will let us obtain average water prices in the users area. Our intelligent application will learn users water use habits,

Machine Learning:

After buying AquaSense, customers can “calibrate” their device to detect the flow from various water sources in their home. AquaSense will first detect a “baseline” flow. The user will then turn on a water source in their home (for example a shower, sink, washing machine, or toilet) and AquaSense will detect the change in flow for that particular appliance. AquaSense will then use this information to better estimate how much water you’re using and where that water is being used, then provide suggestions specific to your habits for how to save water.

Cloud Platform:

We will use Amazon Web Services (AWS) to host our service and hold all of our water usage data. Most of our data processing will occur in the cloud, where processing and storage costs are cheap. This also shifts most of the processing burden away from our sensor box and users’ mobile devices. Since all of our water usage data will be stored in one place, we will also make anonymous usage data available to municipalities and researchers.

IV. OUR BUSINESS MODEL

Overview:

The initial AquaSense model will be targeted towards homeowners and single-tenant businesses. Our revenue stream consists of hardware sales and advertisements on our mobile application. The device will be available on our company website, through online retailers, or in retail stores. The mobile application will be available for free with the purchase of the device and will be the interface by which the consumer interacts with the sensor device and their water usage data.

Beyond providing water conservation recommendations and real-time analysis of the user's water consumption, the intelligent mobile platform will also recommend appliance upgrades that can potentially save users water usage and cost. In this way, home appliance companies can use our platform as a resource for effective advertisement, and subsequently provide our company with additional revenue sources.

Revenue from Sales:

The majority of our revenue will be generated by the sale of our hardware at $99.99, a 3x markup over the cost to manufacture the units. The AquaSense device will be available through our company website, online retailers such as Amazon, or in retail stores such as Lowes, Home Depot, and Best Buy.

Advertising Revenue:

Beyond the sale of our units, revenue comes from advertisements for home appliance companies presented unobtrusively by the app. Users can be presented with other water conservation options (beyond simply adjusting consumption habits) like water-saving home appliances that will save them more money. Everything will be presented in a very informative manner that outlines before and after water consumption and cost. Essentially, this advertising not only inform users of ways to be more eco-friendly with their water consumption but also shows users that buying these products could save them money.

Water Savings Estimates:

According to the U.S. Geological Survey's 2010 Water Census, the daily per capita water use in the United States is approximately **88 gallons per day** for domestic use (including both outdoor and indoor use). Conservative water use habits can **conserve up to 25 gallons** per day.

Using these approximations, we estimate that our users could save up to **9,000 gallons per year**, or a savings of **$50-70 per year**. These saving compliment the real-time feedback from

the AquaSense product to allow the user to not only become way more aware and proactive about their water consumption/habits, but also offset the product cost in only a couple of months.

Rebates and Incentives:

Some utilities companies offer $20 - $100 incentives to consumers who purchase Nest. We could easily get proportional subsidies from water utilities, in the range of $20 - $40 per unit. However, utilities usually don't advertize these rebates. These rebates are generally up to consumer to pursue.

Insurance Company Endorsement:

Insurance companies (e.g. Farmers) already offer "green" incentives for Energy Star devices that save electricity and water. AquaSense easily falls under this "green" category. AquaSense can also alert users to spikes in water flow (indicating leaks or burst pipes). Having this early warning of water leaks could save users a lot of money on costly home repairs. We think insurance companies will readily offer discounts for homeowners that have our product.

Comparison to Nest:

We will have a similar distribution model, selling through online retailers, retail stores, and directly through our website. Nest is able to sell 70,000+ units per month through these outlets. Several products offer compatibility with Nest. For example, Nest can talk to Whirlpool washing machines, let them know when you're out of the house so they periodically spin your clothes so they don't wrinkle. Nest can also talk with August Smart Locks that let Nest know as soon as you return home. We could potentially have our device communicate with Nest. Other intelligent device companies (Nest, August, Whirlpool) use the home wifi network the same way we will to communicate with their mobile applications. To date, these companies have had no major issues with connectivity.

Dealing With Compatibility Issues:

Our unit design suits the majority of home use cases, but there are always exceptions. We will offer a "Will AquaSense work for me?" guide on our website that users can use to determine if AquaSense will work in their home environment. Nest has a similar problem - Nest devices will not work with high-voltage thermostats and have similar wifi range limitations. This does not stop Nest from working in the *majority* of cases. For users who purchase AquaSense devices and find that AquaSense does not work in their home (does not fit near the water meter, completely out of wifi range) we will of course offer free returns.

V. OUR MARKET AND ECOSYSTEM

Customers:

Our initial customers will be single-family homeowners (age 25 - 60) and single-tenant businesses, such as restaurants, bars, and shops. These are business where one entity owns or rents the entire building, meaning they have full control of the water supply. We will initially focus on regions with scarce and expensive water, namely California. In addition, there will be a sizeable percentage of consumers, who are either eco-friendly or tech-savvy, and will want to be involved in this environmentally friendly and "internet of everything" product.

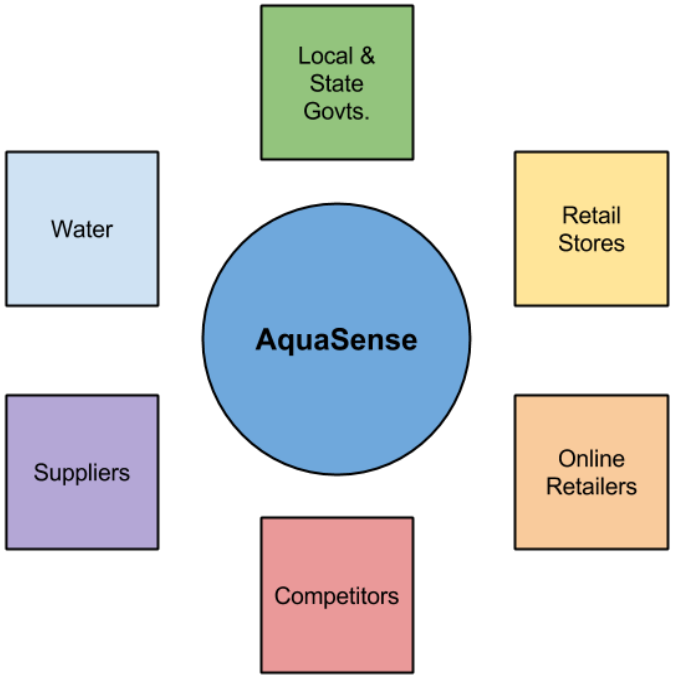
Size of Our Market:

The size of our market is estimated to be about 15 million people, which is only 5% of the population (just considering US population for now). This population estimate projects our target market to be worth at least **$1.5B**. We strongly believe that this is a fairly conservative estimate, given that not only is water a critical resource for life that is depleting at unsustainable levels and worrying for our environment, but also the rising prices of water have begun to climb quite rapidly in the past couple of years (and will continue to rise drastically in the next few years to come). This provides a desperate need for our product (at an ideal market entry time - not too soon/late) in order to help consumers to become more aware of their water consumption habits and help adjust them towards sustainable levels for our environment.

Ecosystem Positioning:

AquaSense's environment consists of:

- necessity and precedent (a water price and water conservation crisis)
- suppliers (outsourced materials and production)
- outlets to sell our product (retail stores and online distributors)
- local and state governments (incentives that enhance the appeal of our product and reduce its cost for the user)
- and competitors to our product



Suppliers:

Other companies will supply the sensor box, ultrasonic sensors, microcontroller, and wireless networking components. We will also outsource final assembly and testing of our system. We will focus on the design and sale of our product.

Online Retailers:

We will make most of our early sales through online retail. This greatly reduces our cost to distribute our product. These online retailers, such as Amazon, have vast resources for global distribution and a large reach amongst consumers.

Retail Stores:

Selling our product through retail stores puts a tangible product closer to our users. Our product can be sold alongside other water technologies that users may be shopping for.

Local and State Governments:

Governments can endorse our product and suggest it to their constituents as a way of conserving water. This is more likely in regions with drought and scarce water. Government subsidies or tax deductions could also help our product sales.

Water:

Ultimately, our product hinges on two things: the growing scarcity and rising price of water. If the regions we're selling in, for example California, suddenly become wet climates, a portion of our business could suffer. We are poised to make a lot of short-term sales in regions where drought is prevalent. Historically, drought shifts to various regions of the United States every 5-10 years, so our marketing and sales focus will shift with these drought regions. Given the current state of drought in the United States, we plan to make our initial product release in California and the American Southwest.

Our Competition:

There are several other companies that make water flow monitoring products. However, all of our potential competitors offer more expensive or inferior technologies that simply cannot compete with the AquaSense platform. Our top 3 competitors are:

1. **Driblet** (http://driblet.io/)

   A Mexico-based startup with 2 employees, Driblet offer a conceptually similar system with wireless connectivity, a basic mobile application, and a cloud-based platform. Their devices must be screwed onto individual pipes behind shower heads and faucets. Each Driblet device offers flow information for only one source of water consumption in the home. Their overall system is bulky, low tech, and still in the early stages of development.

2. **Aquiba** (http://www.aquiba.com/)

   An Australian and British company with large commercial backing, Aquiba is a joint venture of Sentec Ltd (a manufacturer of sensor technologies) and Takahata Precision (a global manufacturer of meters). Aquiba offers very accurate flow readings using ultrasonic technology, but at a price of more than $1000 per unit. These device must be inserted into the pipe, requiring a professional to install them. Aquiba primarily focuses on industrial applications that can justify their high cost.

3. **Elster** (http://www.elstermetering.com/)

   A German manufacturer of metering technologies for gas, electricity, and water, Elster offer domestic smart meters for electricity and water. Elster's devices primarily send usage data back to the utility providers, but users can view their usage statistics on a simple LCD display that comes with each device.

Driblet is the closest competitor in our space but they have inferior technology and are poorly funded. Aquiba and Elster are already well-established commercial companies but smart meters are only a portion of their business. Both focus primarily on industrial applications that can justify the high cost of their technology. None offer any competitive software applications with their products.

VI. FINANCIALS

We present a high-level overview of our financials here. For a detailed breakdown, please see the Financial Plan spreadsheet.

Revenue:

The majority of our revenue will be generated by the sale of our hardware at $99.99, a 3x markup over the cost to manufacture the units. We are expecting our first year to not generate any revenue because we will be spending our time developing a market-ready prototype and intelligent platform. Afterwards, we estimate that our product will begin to sell, on average, 2,000 units per month in the second year and eventually grow to 30,000 units per month in the fifth year. In year 5, our revenue is projected to be about **$35M**.

Profit:

Including the cost to manufacture each unit, employee wages/benefits, development and research costs for long-term growth, we expect to make a loss for the first year of about $700k, followed by a smaller loss of about $500k in the second year. The next 3 years we estimate that our product will begin to generate gradually increasing revenues, eventually on our fifth year leading to an estimated profit of about **$17M**.

Cost to Manufacture Each Unit:

Our manufacturing costs, in particular the costs of our circuitry, are only reasonable at at scale of 100k+ units. Most of our key electronics components will come from Texas Instruments (TI) and similar manufacturers. The AquaSense device includes:

Description of Key Components	**Cost (USD)**
TI cc2590 wireless RF transceiver and MCU	1.98
Futurlec waterproof ultrasonic sensors	3.90
Molex Inc wireless RF antenna	2.06
TI TLC7701 power control unit	0.63
Plastic ABS enclosure	1.00
AA battery holder	0.85
Mounting hardware	0.79
Conservative Estimated Cost of Materials	**$15.00**

In addition to the cost of raw materials, there will be an associated cost with manufacturing these units. We estimate this cost will be $10/unit based on similar products. Again, all of these estimates are extremely conservative.

Low-end estimate: $25 per unit **High-end estimate: $35 per unit**

Other Service Costs:

We will need to maintain a web services platform for storing, processing, and serving data. Our product will use the Amazon Web Services (AWS) platform. AWS usage readily scales with demand and our initial costs will be small. Initial AWS costs will be less than **$10k** per year.

Employee Costs:

To build out our service, our product, and our mobile applications we will need at least 2 software developers and 2 hardware developers to create a fully-operational prototype, and prepare it to come to market. Competitive salaries start around $90k each, so our engineering team will cost roughly $360k per year. Including the 4 founders as executives. We will also need an administrative team. Marketing and sales will be critical to the growth of our product. We estimate that we will need 2 sales executives and 1 marketing executive, starting at a similar **$80k** each. Counting our 4 person team leading product management and development at **$100k** each, we estimate that employees will initially cost **$1.3M** per year.

Sale Price:

We aim for a gross margin of 30% or higher. We will start with a sale price **$99.99 per unit**. This is a roughly **3x markup** over the cost to manufacture our product. We think consumers will be willing to pay this price for our device and will see additional value in the free software and water savings that comes with it. The incentives that consumers receive from municipality conservation programs will also reduce the cost of the device by $30, on average.

Funding:

Series A funding **($900k)** will allow for our company to start and produce a fully-operational prototype and software platform, and establish a foundation for future production and distribution. Seed B funding **($600k)**, in the second year, will provide capital for production, marketing, and distribution. This will also provide a significant financial foundation upon which the company can take off from. Seed C funding **($1.8M)**, in the middle of the third year, will provide a means of expanding the company (long-term growth) to several new locations across the country, scaling up production, and developing new technologies, as well as updating versions of the initial product.