



BUSINESS PLAN

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MAS Climate Science and Policy Capstone
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Section I Executive Summary

SanSal is a water producer based in California that aims to end water scarcity through renewable desalination. We understand the nexus between water and energy in that, one process is necessary to produce the other. In desalination, this coupling has a huge reliance on unclean energy. Worldwide, the process to supply electricity to large-scale desalination facilities consumes more than 200 million kilowatt-hours of fossil fuel derived energy each day. (Energy Minimization and Greenhouse Gas Reduction Plan, 2008)

The Middle East and North Africa have been leaders in desalination in the past but now, we are the pioneers in the States introducing a new system of desalination that encourages innovation and market expansion while promoting unlimited, unbiased access to clean water. The SanSal system provides Micro-desalination plants to California's coast that run on renewable energy. By designing plants that are smaller in scale, SanSal can successfully power them with solar energy as opposed to building large plants that rely on fossil fuel to run at capacity. Furthermore, SanSal will correct for the antiquated aqueduct systems. Instead of delivering water from hundreds of miles away, water can be generated by our plants locally and reliably.

SanSal is seeking funding for equipment costs and salaries. The project will cost 10 million dollars and while the profitability in the first year will be low, substantial growth is expected each year that SanSal is operational. Specifically, after running pilot programs with small communities, SanSal will look for partners in order to expand its reach outside of the coast. Fresh water and aquifers are so depleted that the cost of running pipes from the coast to the central valley will be more economically and environmentally viable compared to shipping freshwater from northern California.

SanSal is among the first movers in the market and is meeting the opportunity to serve small communities and farms that want to have better control of their water instead of complying with large water utilities that are free to inflate prices. SanSal's water system has the potential to build a new water culture. SanSal's expert team of scientists, engineers and entrepreneurs are rethinking humans' relationship to the ocean. Using the SanSal system with carefully devised sustainable methods, communities will understand where their water-- and their water bill is coming from. The micro-plant design caters to community-based welfare, providing residents with optimal water quality. This is especially valuable in Southern California, as it has been notorious for poor water quality. SanSal also intends to reach out to coastal vineyards. Much of California's farmland has been unused due to water shortages. (Kuminoff, 2013) With the growth of SanSal, will come the reinvigoration of farm-land. Small hotels catering to approximately 50-100 guests will be a good fit for the San Sal system. The system can accommodate those water needs while providing an eco-friendly escape for tourists.

The small desalination pods have low upfront cost comparatively to large-scale plants and therefore, present lower financial risk. Large desalination plants such as the Carlsbad plant accounts for 7% of San Diego's water supply- not nearly enough to end water scarcity problems in the area allowing space in the market for SanSal. (IDE Technologies, 2016) To begin operation, SanSal is looking to raise 10 million dollars from investors. The key use of funds will be for major equipment and installation which will account for over 70% of expenses. Investment offerings of \$2 million will be made with a \$5 cost per share. Within SanSal's first 5 years, it is planning to take 10 percent of the market share by initially targeting California, and then expanding internationally.

Section II Company Overview

SanSal is the product of a master's project for the Climate Science and Policy program at Scripps Institution of Oceanography. The founder is a student Rebecca Stark from Long Island, New York. The Company is applying to incorporate in California as a for benefit corporation meaning, that beyond maximizing shareholder values, its expanded purpose is to serve employees, customers, community, and the environment. Furthermore, the company must submit annual benefit reports to assess their overall social and environmental practices using a third party assessment tool. These reports must be publically available. Becoming a benefit corporation is most suitable for SanSal to achieve their objectives and stand by their values of reaching sustainable goals and running a business that will mitigate the effects of climate change.

Thus far, SanSal has been successful in forming relationships with IDE Technologies, a world leader in water treatment solutions. They will provide the modular desalination pod for our system. IDE Technologies has previously partnered with municipalities, oil & gas, mining, refineries and power stations. (IDE Technologies, 2016) SanSal will be the first private company to partner with IDE and use solar energy to power the micro-plants. SanSal is applying for federal and private grants in order to raise money to begin the pilot project. Also, SanSal is actively seeking communities to launch the project.

1- Mission Statement

At SanSal our mission is to reinvent the way the world desalinates water by making the process sustainable and using renewable, solar energy. Our power is in our eco-conscious customers and our creative employees- so, we emphasize innovation and an entrepreneurial spirit in the design of each micro-desalination project to ensure the fairest water prices and the best site-specific, technological- configuration.

2- Value Proposition

America's first commercialized micro desalination system to run on solar energy. A sustainable solution to water scarcity.

Concentrating on Sustainability · Driving Innovation · Transforming Water

Section III Industry Analysis

3- Market Overview

Worldwide, the desalination industry size is \$8.6 billion. By 2018, the global water desalination equipment market is estimated to reach \$15,274 million, with a projected compound annual growth rate of 9.1%. (Freedonia, 2011) This points to a high demand in municipal and industrial applications. A major demand for this desalination process comes from municipal end-uses. The technology is used to convert available water resources into potable water for consumption. The industrial sectors such as oil and gas, incorporate the use of fresh water in their processes, which are also drivers for this market; however, SanSal's size of plant cannot satisfy the large water demands for the industrial sector. SanSal will focus on municipalities and small coastal agro uses.

The incentive to switch to desalination in California lies in the extreme water shortages that have been estimated to cause the ploughing of 410,000 acres, and the loss of 14,500 jobs. Ultimately, it is calculated to cost the agricultural industry \$1.7 billion. (Howitt 2014) SanSal does not intend to control the agricultural market, or supply water for the 25 million Californians. Given the high demand for desalination between water shortages and risk for extreme loss in the agricultural sector in California, SanSal expects to grow in market share after launching a pilot project.

SanSal's system is part of the containerized market which had a market value of \$830 million in 2013 with an annual growth rate of 15 percent according to research by the International Desalination Association. (Appelman 2013) Within SanSal's first 5 years, it will plan to take 10 percent of the market share by initially targeting California and then expanding internationally.

Section IV Customer Analysis

4- *Target Customers*

Farmers: As groundwater extraction by farmers is more tightly regulated since recharge in aquifers cannot keep up with demand, farmers have an unmet need for more freshwater. Farmers on the coast will be a market that SanSal plans to enter. Two-thirds of the agricultural land in California is concentrated in the Central Valley and the Central Coast. SanSal will target the central coast farmers. Small Vineyards on the coast can survive on the daily allocation of water from the SanSal system, but most will need more than one desalination unit. For rangelands pastures, SanSal's system can be used to supplement water from shortage. The farmers' needs are immediate and SanSal's small size and ability to set up a system quickly is crucial to meet their demands. For farmers located far from the coast, SanSal will not be able to serve them instantly as it is only serving coastal farms in its opening.

Hotels: These hotels are small and coastal where the system describe would serve about 50-100 people depending on water usage. In San Diego, green hotels would be interested in using the SanSal system because their aim is to be environmentally conscious. They are committed to sustainable practices. Many green hotels in San Diego are energy efficient and LEED certified, while others provide organic products and focus on recycling programs. These eco-aware establishments use solar panels, and biodegradable materials. In addition, they provide eco-tourism activities while staying low impact to the environment. (Green Hotel News, 2015)

Communities: Coastal communities of approximately 30 homes (4 people per household) in San Diego County could utilize one SanSal system. According to the most recent census, there were 35,021 homes with over 60 percent of the population earning greater than 50,000 dollars

per year in income and 43 percent earning great than 75,000. SanSal’s upfront cost will be affordable to these wealthier families on the coast and SanSal’s environmental and social impact can be appealing to the mostly family households in the area (58%) who want are aware of the growing problem of available freshwater. (USA health, 2013) These families experience the drought through their water bill. While they are still able to live comfortably through drought, they may have higher priced water and may have to give up their lawns. SanSal will allow these families to live more comfortably in a sustainable way. (Mandatory Use Restrictions, 2015)

5- Customer Needs

Ultimately, customers in San Diego need SanSal because is it a relatively low risk alternative to mega desalination plants and it provides the same potable water for their everyday needs. For customers that will use greater than 5,000 cubic meters per day, SanSal will be a useful supplement. The quality of product is without question as it is from the top desalination technologists in the world, IDE. Our customers want reliability and that is what SanSal can offer through technology and customer service. Most importantly, SanSal system users will be able to understand the cost of product as it is not managed by a large inaccessible private company. SanSal is small, local and transparent company.

Section V – Competitive Analysis

6- Direct Competitors

RO renewable vs. RO desalination- non-renewable: Large scale desalination plants fill the consumers’ need with the same solution- Desalinated water to produce potable water. Table one outlines the strengths and weaknesses comparatively.

SanSal	Carlsbad Desalination Plant
Utilizes solar energy for a significantly lower operating cost	About \$1000/acre-foot

Not limited to regions with large power source	Has Large carbon footprint due to energy consumption
Modular design makes it scalable	100% of briny discharge is released back into the ocean in super concentrated form
Solar panels take up land	Reliant on power plants
Brine discharge can be evaporated in pods instead of immediately piped to the ocean	Technology, water produced and distribution managed by two private companies and the water board

The carbon footprint of the Carlsbad desalination plant 97,165 metric tons CO₂/yr. (Energy Minimization and Greenhouse Gas Reduction Plan, 2008) According to University of California, Berkley's carbon footprint calculator, SanSal is 189.6 metric tons CO₂/yr. (CoolClimate Network) SanSal of course, is a much smaller water producer. Carlsbad produces 300 times the water SanSal produces. When brought to scale however; SanSal's footprint is lower due to its reliance on clean energy.

7- Indirect Competitors

Waterfx: SanSal relies on existing renewable technology and smaller plants; whereas other entrepreneurs have targeted different water sources. Waterfx is a company that desalinates irrigated water. Their strength is in their product "Aqua4" which is an engineered aquifer that brings down the cost to \$450 per acre foot. They also target farmers and use solar to desalinate. Their weakness is in that the company cannot provide more than 70 acre ft of water per year. (Aqua4 - WaterFX, 2014)

Section VI Marketing Plan

8- Products & Services

SanSal is offering customers a chance to consult with experts in renewable desalination. SanSal will take care of the customer from start to finish. SanSal will survey the area to determine if the team can set up the IDE desalination pods that produce 5,000 cubic meters of water per day. Permitting and regulations will be managed by SanSal. The solar power to run the pods uses 500

solar panels to power it. In order to reduce land use, solar trees will be available. A 750 KW generator is also installed to make sure the plant is powered 24/7.

9- SWOT Analysis

<p><u>Strengths</u></p> <ul style="list-style-type: none"> • Competitive pricing with large RO desalination facilities make it easier to reach our target market. • Located in San Diego where desalination is an emerging market • The first major commercial micro desalination plant system to run on renewables • Environmentally friendly and sustainable • Renewable technology is becoming cheaper • In concert with San Diego goals for the Climate Action Plan 	<p><u>Weaknesses</u></p> <ul style="list-style-type: none"> • Negative stereotypes associated with desalination • Unfamiliar concept to some Americans • Pricing is abstract in its current state and needs future development • Land use for solar panels
<p><u>Opportunities</u></p> <ul style="list-style-type: none"> • Easy to franchise and expand quickly. • Ability to popularize use of desalination, and allow market to expand • Create partnerships with local entrepreneurs • Large coastal area to start building pods 	<p><u>Threats</u></p> <ul style="list-style-type: none"> • Getting stuck in regulatory oversight • SDG&E (the power provider for Carlsbad desalination plant) is pledging to turn mostly renewable • Competition overtaking target customers

10- Pricing

SanSal aims to be a premium brand of desalination. It is low cost comparatively to large plants; however, the cost of renewable desalination is dependent on the cost of the renewable energy. Therefore, energy input of fossil fuels makes conventional desalination lower cost at a scaled down size. According to International Renewable Energy Agency (IRENA) “the cost of desalination has been decreasing over the last years down to USD 0.5/m³, while market prices for desalinated water are typically between USD 1/m³ and USD 2/m³. Therefore, desalination is currently affordable for middle-income regions, not yet for the poorest countries.” The cost of

renewable technology is rapidly decreasing making SanSal able to compete with traditional desalination systems especially in more remote regions where the cost of energy transmission exceeds the cost of distributed generation. (Isaka, 2012)

Section VII Management Team & Partners

11- Management Team Members

SanSal is pursuing a Director of Process Systems Engineering as well as a Chief Financial Officer to take over financial planning and development responsibilities.

Co-founder and Chairman- Rebecca Stark

Rebecca Stark holds a master's degree in Climate Science and Policy from Scripps Institution of Oceanography. She studied Marine Science at Boston University (BA) and worked in Development and Fundraising from LearningSpring School in New York City. She has full ownership of SanSal but plans on reducing her ownership to 70% as she recruits a Director and CFO who will collectively take 30% ownership of the company. Her primary duties include: establishing company policy and objectives, leading strategic direction, budgeting resources, managing relationships, responding to regulatory measures and overseeing performance.

Director of Process Systems Engineering- TBD

The incumbent will plan and direct all aspects of engineering within SanSal and absorb 15% ownership of the company. S/he will ensure projects follow SanSal's policies and the permit regulations of the state of California. The position requires a graduate degree in civil engineering or closely related field and a minimum of 5 years' experience in a management position. The incumbent will exhibit expertise in a variety of the field's concepts, practices, and procedures. S/he performs a variety of tasks and leads and directs the work of others. A wide degree of creativity and latitude is expected.

Chief Financial officer- TBD

the incumbent will define and implement the infrastructure or systems needed to support substantial growth over the next five years. S/he will continue to build and manage effective and streamlined administrative and financial systems, including: financial, accounting, legal, information technology (IT), human resources (HR). The CFO will be involved in strategic planning, evaluation, and professional development initiatives, as well as planning for SanSal's expansion to multiple new sites both locally and in other cities.

12- Board of Directors: Roles and responsibilities

SanSal's board's work is primarily focused of fundraising, strategic planning for the organization. The board will be comprised of up to 10 members; however, the current size will has a limit of 5 and will grow as SanSal expands. Members must show a true commitment to the advancement of SanSal and a desire to build the company. The nominating committee for the board will consider diversity in professional experience, background and viewpoints; as well as, gender. The requirements for board membership are a variety of skills outlined below:

- Leadership
- Industry experience
- Risk management expertise
- Regulatory experience
- Financial expertise
- Academia
- Environmental and sustainability
- Engineering
- Entrepreneurial perspective

13- Partners

IDE Technologies- "A world leader in water treatment solutions, IDE specializes in the development, engineering, construction and operation of enhanced desalination and industrial water treatment plants." SanSal will be using their "ProGreen Plants". (**IDE Technologies, 2016**)

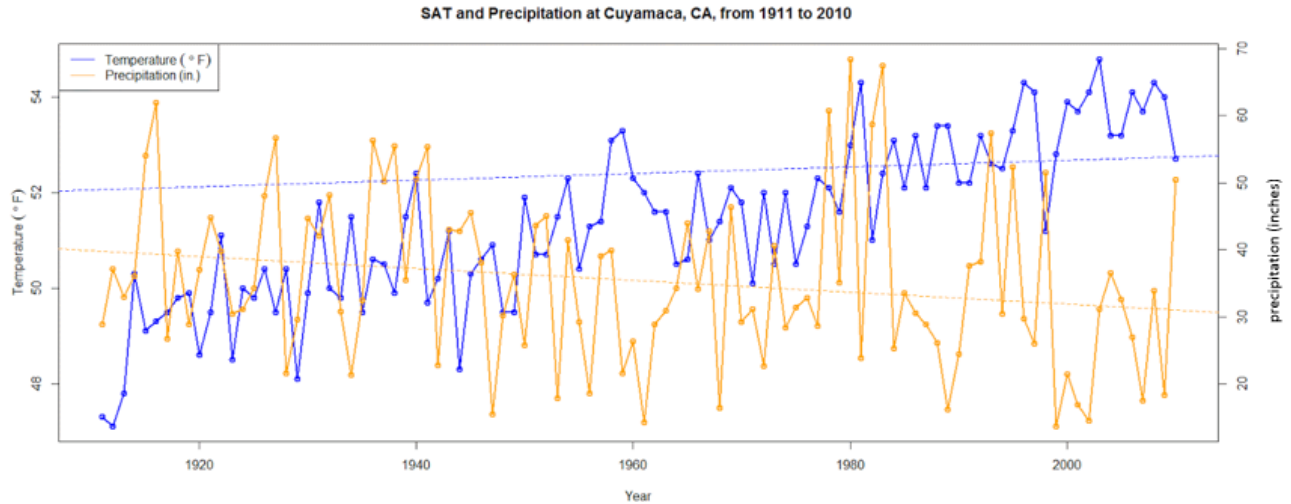
Local Water Districts- SanSal is looking to contract a local water district to set up a pilot project. SanSal's water would mix with their freshwater source and it would serve as a demonstration of project success.

Section IX Financial Plan

The small desalination pods have low upfront cost comparatively to large-scale plants and therefore, present lower financial risk. Large desalination plants such as the Carlsbad plant accounts for 7% of San Diego's water supply- not nearly enough to end water scarcity problems in the area allowing space in the market for SanSal. (IDE Technologies, 2016) To begin operation, SanSal is looking to raise 10 million dollars from investors. The key use of funds will be for major equipment and installation which will account for over 70% of expenses. Investment offerings of \$2 million will be made with a \$5 cost per share. Within SanSal's first 5 years, it is planning to take 10 percent of the market share by initially targeting California, and then expanding internationally.

Appendix

Appendix A



Data:

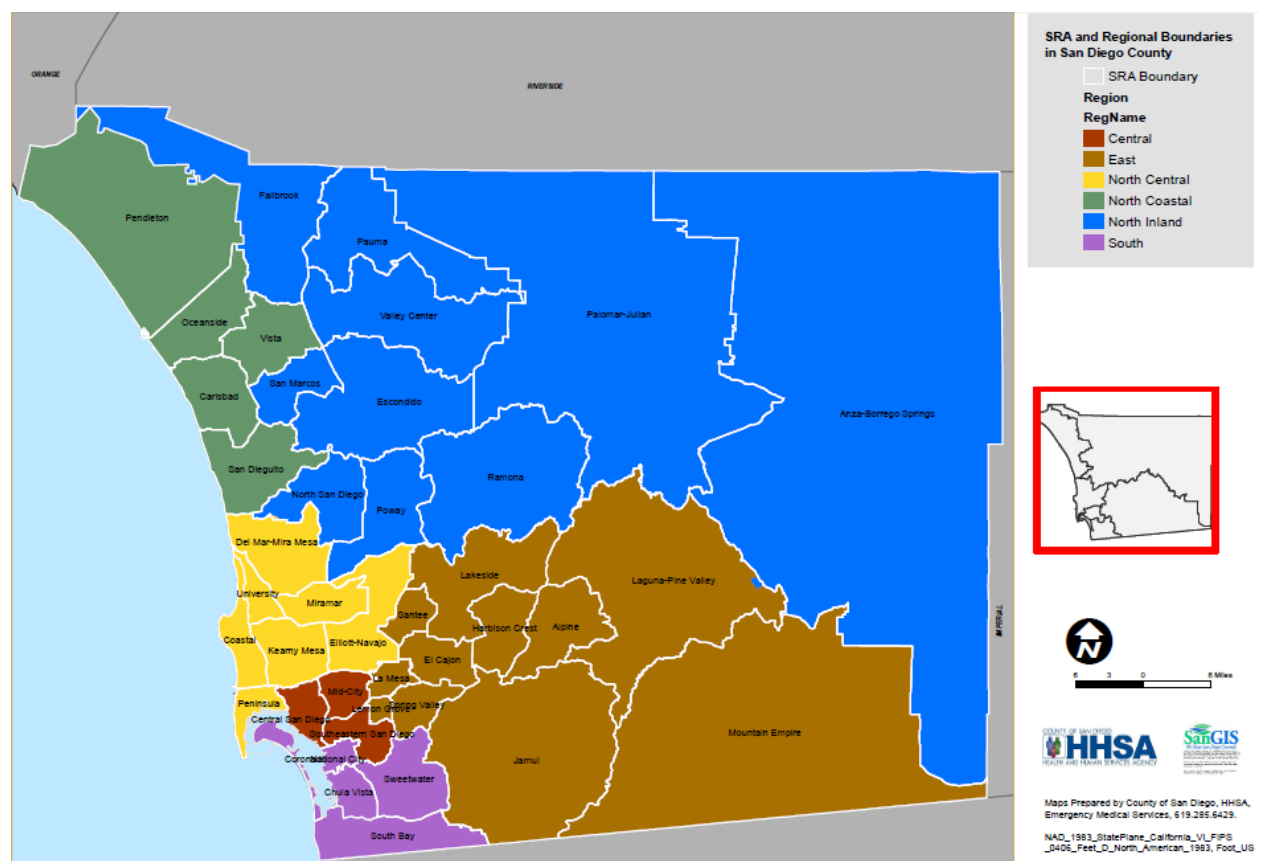
This Long-Term data are daily climate records from Cuyamaca, CA graphed with R-programming. The Cuyamaca station is part of San Diego County. It is representative of the general climate trends of the city and the greater San Diego area. This data set has approximately 40,000 data points. The source is The United States Historical Climatology Network (USHCN), a high-quality data set of daily and monthly records of meteorological variables from over 1,000 stations across the forty eight contiguous United States. Each station's Daily data include observations of precipitation amount and Monthly data have mean temperature.

Cuyamaca data spans from 1911-2010. The precipitation charts indicate a declining trend of rainfall; the correlation coefficient is weak, but positive at, 0.04. Declining Rainfall and drought mean less available fresh water. In southern California especially, conservation of natural fresh water is already an issue. This data demonstrates the need to plan to use alternative sources of water in order to combat freshwater depletion. The temperature line reveals an overall rising trend. The data is strongly correlated with a value of 0.70. While the rate of evaporation was not calculated, rising temperatures over time will increase the rate of evaporation to some extent. If already depleted freshwater is evaporated increasingly overtime, provisions to supplement the scarcity of freshwater need to be made. The combination of increasing temperature and decreasing evaporation rate sparked the impetus of SanSal. SanSal will develop desalinated water to take the pressure off of freshwater sources by making a

minimal carbon footprint in comparison to large desalination plants that are large fossil fuel burners and contributors to the climate change problem. (Figure 1)

Appendix B

The map of San Diego County is by County of San Diego, Health & Human Services Agency, Public Health Services, Community Health Statistics Unit. North Coastal communities were analyzed to represent the “Communities” target market. (USA, Health and Human Services, Community Health Statistics, 2013)



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