

A2WH Clean Tech / Green Biz brief

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A2WH Company & Product Description:

The [A2WH Grow Dryland](#) provides a critical source of water needed to start trees on dry, degraded or desertified land where it would otherwise be infeasible to grow trees due to lack of water or degraded soil conditions. The Grow Dryland supplies the water needed to keep seedlings alive through the worst drought. The rest of the Grow Dryland process makes it feasible to grow mature food producing trees on land where it would otherwise be infeasible.

The Patented A2WH technology extracts water from air using low grade Solar Heat as the primary energy source. The core design also allows it to work in a broad range of conditions and it will produce the most water on the hottest summer day when water is most needed. It is specifically designed to operate in locations where no electricity available. A2WH absorbs water from air at night when the relative humidity is highest and converts it into liquid water using solar heat the following day. The absorption process only requires a volume of air to be moved through the system and does not require any expensive refrigeration process. The ability to use low grade solar heat allows cost effective collection of the required energy at a lower cost than other renewable technologies. The desiccant and high nighttime humidity allows the system to be used in a broad range of climates and can operate in lower humidity than refrigeration based systems. A2WH is cost effectively scaled from a few ounces per day to millions of gallons per day.

The Grow Dryland product is a simplified version of A2WH specifically intended to start trees in locations where the seedlings would normally die of dehydration before they could become established. There are also portable A2WH versions which produce potable water for human consumption during emergency and refugee scenarios and heavier A2WH potable water versions with a life span over 20 years.

Problem A2WH Solves:

Water is essential for humans to drink but it is equally essential for food production and the environment. The total freshwater supply is limited and in many locations there is an inadequate supply of water where it is most needed even when it may be plentiful a few hundred miles away.

The A2WH Grow Dryland product was designed to tackle the desertification problem worldwide. In the shorter term it is targeted at providing water to start trees in locations where the trees will be beneficial. The United Nations UNCCD and others credit soil degradation and over pumping of ground water as key drivers for desertification. As such any solution needs to solve the problem without increasing the need for pumping groundwater and without requiring more surface water. There are already millions of square miles of degraded land and we are losing millions of productive acres every year due to degradation. This is happening when both the U.N. and the WHO indicate a need to increase food production capacity.

The A2WH Grow Dryland process provides a means of reversing soil degradation without increasing demand for ground water while increasing the total food supply. It provides an incentive for local people to incrementally adopt the solution because they receive direct tangible benefits. Eliminating the need to pump additional ground water is critical because water is already over allocated and dropping ground water is already contributing to the desertification problem. A2WH will help farmers and herders convert abandoned, desertified and degraded land into an auxiliary food supply that can produce thousands of pounds of edible fodder per acre from land that is currently unable to produce anything but eroded soil clogging the bottom of critical reservoirs. During good rain years this foliage can be used as high nitrogen mulch which improves the soils ability to absorb and retain water while eliminating the need to apply harsh and expensive commercial nitrogen fertilizer. This mulch has been proven to more than double production of grass and other crops as compared to untreated land. During drought years animals can directly consume the fodder so herders are not forced to overgraze already stressed grasslands or sell their animals at discount that causes them to go further into debt.

The A2WH Grow Dryland machine uses solar heat to produce enough water to keep seedlings alive during the worst drought while the rest of the Grow Dryland process maximizes water retention from rain so it is available for use through the life of the tree and as a side effect minimizes soil erosion, minimizes water lost to surface evaporation, minimizes water lost to runoff and maximizes water that soaks back into recharge the water table. In the short term A2WH is focusing on local niches such as starting erosion control and wind break trees on land where there is no surface water available where it is not economical to install irrigation systems to deliver the water. We are also pursuing desert agriculture where high wood value trees can be grown on land with good sun and long growing seasons but where there is insufficient water to support the trees. Some of the smaller segments can domestically consume 20 to 30 million units with moderate market penetration.

The U.N indicates 700 million people will be forced to migrate due to water scarcity before 2030. The common NGO approach of drilling more wells is encountering limits because in many areas wells are already failing due to dropping groundwater levels and over drawing (over pumping) groundwater contributes to desertification. The A2WH Grow Dryland process delivers the critical water needed to increase food supply without increasing the need to pump ground water. The A2WH process can help recharge the local ground water while revitalizing the soil and increasing food supply. Ultimately this combination will reduce the ability of drought to cause famine. When the A2WH Grow Dryland process is widely deployed it can improve the ability of people to survive in Dryland locations which may reduce the need for those people to migrate. If A2WH is used to reduce the 700 million people the UN thinks will migrate due to water scarcity then it will reduce the cost and social impact on the counties who would otherwise be forced to absorb the refugees.

What makes A2WH a promising clean tech company?

A2WH is the only Air to water harvest technology specifically designed to produce water in warm dry countries without requiring fuel or electricity infrastructure. This allows A2WH to be deployed in a widely distributed fashion across millions of acres where it would be infeasible to deploy other technologies. This combination is essential for solutions applied to diffuse problems like desertification.

A2WH Grow Dryland process has the unique ability to simultaneously revitalize degraded land, increase food supply, recharge water tables, reduce ability of drought to cause famine and sequester carbon. The distributed nature of the technology also reduces the risk of a single catastrophe from impacting more than a small portion of the deployed fleet.

A2WH provides a substantial market now and much larger markets to grow into as those segments mature due to increasing water scarcity and desertification problems worldwide.

- **Short term** - The A2WH Grow Dryland can be used for millions of acres to establish erosion control and wind break trees.
- **Medium term** - A2WH Grow Dryland can be used to grow alternate food supply for ranchers and herders which can improve their ability to withstand drought without selling their herds at a discount.
- **Longer term** - A2WH Grow Dryland can be used to convert desertified, degraded and land abandoned due to lack of water or degraded soil so the same land produces thousands of pounds of edible foliage per year which can also be used as nitrogen rich mulch to revitalize surrounding land during the good water years.

As the segment to reverse desertification matures the A2WH Grow Dryland can provide value for a minimum of 1.8 billion acres of land. With 50 units used per acre this segment would provide a worldwide market of 90 billion units. At \$75 per unit price this segment would be worth \$6.75 trillion USD. At very large scale the A2WH Grow Dryland process can also sequester billions of pounds of carbon per year and seed a bio-fuel supply at sufficient scale to reduce global fossil fuel consumption without increasing demand on irrigation or groundwater supplies.

It is possible to produce water from air using refrigeration based systems powered by photo voltaic (PV) collectors or diesel generators. The PV collectors run at lower conversion efficiency and are substantially more expensive per square foot. These two act as a cost multiplier which makes the PV powered systems several times more expensive. In addition the A2WH can operate in locations where lower humidity would make the refrigeration based systems inefficient. Electric units powered by generators can consume so much fuel that they are not cost effective for long term use.

The potable water use of A2WH is an equally substantial market. A2WH is ideal to provide a water supply for every home through rural areas of India and other countries where women and children must walk more than a few hundred feet to obtain water. The [UN indicates 783 million people](#) are without access to improved sources of drinking water but billions more lose at least part of their productive day to obtain the necessary water. Many of these people can be serviced by improved municipal infrastructure but A2WH is ideal to provide for the needs of rural poor who are outside the reach of municipal infrastructure. The same UN report indicates increased risk of Cholera due to increased populations living in peri-urban slums and refugee camps. A2WH helps in two ways where the Grow Dryland process can improve survivability in rural areas thereby decreasing migration into urban slums. A2WH can also provide a safe water source in the urban-slums and refugee scenarios which can be rapidly deployed without major infrastructure projects.

Reference

- Full Reference section for [A2WH Grow Dryland](#)
- [Desertification Land Degradation & Drought global facts and figures](#)

- 925 million people going hungry, 80% of them are smaller farmers & landless poor in rural areas.
- Land degradation affects 1.5 billion people.
- By 2030 water scarcity in arid and semiarid places may display 700 million people.
- Desertification may displace 50 million people during next 10years
- Recent Arable land loss is 30 to 35 times higher than historic rates.
- 1.9 billion hectares of land degraded worldwide.
- 12 million hectares lost per year (enough to grow 20 million tons per year).
- [UN Water statistics and Graphs](#)
 - 783 million people still without access to water.
 - Cholera cases 2000-2010 increased by 130%
- [Global water stress interactive map](#)

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