CARDEN Water Systems, LLC
3440 E. Broadway, Suite 103
Phoenix, Arizona 85040

CARDEN Water Systems LLC (CWS) is based in Phoenix, Arizona. The company designs and manufactures commercial, modular, skid mounted Vertical Membrane, water purification systems. CWS' skid mounted systems may include automatic micro, ultra, nano filtration, RO and High Pressure RO – Desalination, and/or any level of membrane dissolved solids removal. These new vertical technology designs are protected by multiple patents (some still pending) with cogent international patent applications.

CWS also has over ten new patent applications to be filed, which will substantially benefit the water purification and water processing industries. Because of these new patented components, the industry standards of capitalization and operation costs have been proven to be substantially less with an automatic CWS skid compared with conventional, horizontal Reverse Osmosis (RO) equipment.

What separates CWS from its competitors is the unique technology that CWS has developed over the last 4 years. There are five main patents (pending) that enable the new CWS designs to overcome several inherent problems with reverse osmosis (RO) systems. CWS has perfected a world class Vertical Membrane Technology, incorporating full feed water reversal during full pressurized system operation, Positive Displacement Energy Recovery (PDER) for brackish and sea water, as well as a permeate and a front flush Clean In Place (CIP) membrane system. This unique automatic CIP process operates with or without system shutdown. The combination of these new inventions allows the CWS Vertical Membrane Systems to operate virtually maintenance free, at high efficiency with ultra-low energy consumption, on a much smaller footprint than conventional horizontal systems.

CWS can also incorporate an industry unique, reject water, zero liquid discharge (ZLD) mineral recovery system that allows the skids to powderize retentate concentrate and recapture generated steam as permeate. An additional option is a pretreatment system that can be operated as a stand-alone particle separation unit to clean contaminated water for direct discharge from fuel tanks or bilge water as it will separate hydrocarbons and most minerals from almost any feed water supply. The solid, retentate matter can be captured for re-refining or general disposal. As a pretreatment, it can be operated in conjunction with CWS' Vertical Membrane technologies and, as an added benefit, it will make soft water out of hard water, thus further extending the life of the membranes.

This is a major technology breakthrough for processing all kinds of feed water from produced well water, Frac water, bilge water and even seawater. These new devices and technologies help clean CWS Vertical Membranes in place during operations and extend the life of the membranes, which allows the CWS units to operate at very high efficiency rates.

An important feature of the CWS design eliminates the need for a common pressure vessel surrounding the membranes. This removes the inherent problem faced by all horizontal pressure vessels of a "dead air" space between the vessel and the membrane in which bacteria will always grow or, to which particulate matter will adhere. This is particularly true when handling waste streams containing sugar, such as soft drink bottling plants. This feature is critical from a cost savings perspective.

By re-designing and eliminating a large assortment of standard RO components and practices, CWS has substantially reduced the effects of:

1. Operating Costs
2. Labor Costs
3. Maintenance Costs
4. Energy Consumption
5. System Footprint
6. Membrane Failure
7. Excessive water consumption
8. Loss of revenue due to regulatory fines for disposal of waste water

CWS Technology Benefits:

* Can remove contaminates in solution, rejecting and/or recovering them as separate flow streams in a recycle and pass system.
* Production units are fully automated and require minimal operator interface
* Enhances water conservation efforts
* Reduces ground water or municipal water depletion
* Exceptionally small footprint, up to 50% - 90% footprint reduction
* Eliminates 90% of required maintenance in comparison to current RO systems
* Exclusive Energy Recovery System reduces large energy consumption
* Systems can be scaled to handle any size flow, from several thousand/gpd to tens of millions/gpd
* Will accept any RO membrane & size 8" – 16" diameter from any membrane manufacturer
* Automated cleaning (CIP) prevents membrane clogging – increasing membrane longevity
* Unique Vertical Design maximizes membrane performance and operational capacity
* Ease of use allows non engineering staff to operate and maintain
* Additional Power Factor Reduction technology offered as optional feature
* Achieves greater than 90% membrane utilization
* Solar powered options are available
* All systems are "Made in America"
* 99.6% - 99.7% contaminates removed
* Achieve Ultra-Pure Water
* 80% - 90% "Brilliant Clean Water" recovered
* Achieve Brackish Water Reverse Osmosis (BWRO)
* Achieve Sea Water Reverse Osmosis (SWRO)

Sustainable Competitive Advantage

- Stainless Steel Encapsulated Vertical Technology
- Ultra High Performance and Efficiency
- Ultra-low Energy Consumption
- Enhances Environmental Compliance
- No System Shut Down for Cleaning Membranes
- Substantial Reduction of System Maintenance
- Small Footprint and Design requires less infrastructure investment

CARDEN Water Systems, LLC:

* Allows for improved company performance by providing management the tools to quickly respond to changing business conditions by providing a proven solution technology with the ability to address multiple target markets. The small footprint solutions are disruptive to large traditional plants that lack the leverage to optimize efficiency and performance.

* Allows reduction in the overall foot print and space needed to treat water, providing dramatic overall project savings including lowering operating costs with a vertically mounted membrane which doesn't require conventional pressure vessels.

* Allows a solution to multiple treatment problems for both the front and backend flows with ultra-low energy savings. The same system can be used to pretreat inflows or treat backend waste flows.

* Allows the operator to "Clean in Place" (CIP) any single element or any group of elements during full operations, without shutting down. The operator can remove an element and CIP the element in a remote stand-alone CIP loop. Elements can be changed out with minimal down time and "hot flip" each element without shutting down the machine.

* Allows CWS design engineers to completely balance the feed water into each Hyper Filtration Element (HFE), through rapid orifice insertion or adjustment.

* Allows CWPS design engineers to instrument and monitor performance of any single HFE membrane element group, specify and order assorted filter and membrane combinations within the same element group.

*Allows CWS design engineers to process Brackish or Sea Water RO (SWRO) with CWS Power Energy Recovery System (PERS) positive displacement pump depending on the installation and design criteria.

* Allows fast and easy implementation so that users can get up and running with CARDEN Water Purification Systems quickly, as they are 95% operational upon shipping. Easily customize the system to meet customer's specific business needs and integrate into existing applications.

* Allows operators the flexibility to inject additional clean feed water into any selected element or group, inject doping chemicals in any selected element or group of elements, circulate reject water at any point from any element to any element or group and drip dry the entire system for a period of days during temporary shutdown.

Traction

First vertical test/pilot unit (10,000g/d) operating
1 unit sold and operating at a world class winery
Operating demo plant (40,000 g/d –110,000 g/d) Phoenix, AZ
Patented Vertical Membrane Technology
True Zero Liquid Discharge (ZLD)
Discussions with US Military in progress
Multiple orders in progress with global beverage manufacturers
Successfully operated demo plant on numerous waste water treatments

Custom Mobile Site Test Unit available for rapid deployment site testing

In summary, CWS can produce any standard of purified water, from almost any water supply on land and sea. It can pretreat almost any water for direct discharge/reuse or use the water as feed water in its membrane purified water production skid. CWS can also reduce the reject water, mineral retentate to a powder form, condense the steam to water and blend it back with the RO permeate for an approximate 99.5% feed water recovery rate. These are fully integrated and automated systems that can be switched to manual run in case of emergencies.

Board of Advisors

Richard C. Johnson: Twenty-seven years of research, investment banking and management. Capital markets expertise across multiple sectors in both debt and equity, International Business (S. America & Asia), Government and Banking. Managing Director at Guggenheim Capital Markets. Managing Director & Senior Equity analyst at JP Morgan Asset Management.

Arthur D. Schatz: Retired Navy Commander. Senior Executive skilled in business development, teaming and JV agreements with Dept. of Defense Contractors and Cooperative Research and Development Agreements (CRADAs) with DOD Commands and JVs with several foreign defense agencies. Director- Defense Industry with Australian Embassy in Washington, DC. Director of SAICs Advanced Technology Group.

Richard J. Roby: P.E., Ph.D., Chief Executive Officer of LPP Combustion, LLC and a Co-Inventor of the LPP technology. Dr. Roby is also a Founder and President of Combustion Science & Engineering, Inc., an affiliated company of LPP Combustion. He has more than 25 years of experience in combustion engineering related to energy, emissions, alternative fuels, and power production. Prior to founding LPP Combustion and its affiliate, CSE, Dr. Roby was the Director of Combustion Research at Hughes Associates, Inc. Dr. Roby began his engineering career in 1979 at Ford Motor Company testing alternative fuels in spark-ignition and diesel automotive engines. He received his A.B. and B.S. in chemistry and chemical engineering, respectively, in 1977 from Cornell University, his M.S. in mechanical engineering in 1980 from Cornell University, and his Ph.D. in mechanical engineering from Stanford University in 1988.

CWS Contacts

R. Carter Dye: Managing Member
3440 E. Broadway, Phoenix, AZ 85040
480.818.3525
cdye@cardenwater.com
caragancapital917@gmail.com

Dennis Chancellor: Managing Member
3440 E Broadway, Phoenix, AZ 85040
480.390.1918
dchance@cardenwater.com

CWS fully automated skid mounted demo unit showing Vertical Membrane Technology (above) and PLC Assembly (below). Unit is capable of treating 100,000 gallons per day.

Demo Trailer - 22’ feet long (plus 5 feet for hitch) - 9 ft. wide