







Off-Grid Gas Specialists LPG | SNG | CNG | LNG Products and Systems



Our products allow businesses located off the natural gas grid, or under gas supply curtailment, to operate. We eliminate downtime ensuring people can work and goods and services can flow to markets.

Algas-SDI manufactures Liquefied Petroleum Gas (LPG), Synthetic Natural Gas (SNG), Compressed Natural Gas (CNG) and Liquefied Natural Gas (LNG) products and systems. Over the last 80 years, we have deployed 20,000+ systems in over 87 countries spanning 6 continents. Collectively, these systems provide an estimated 9 BCF of natural gas equivalent energy per day.

Algas-SDI developed its first vaporizer in 1932. Today, we still lead our industry in quality, innovation and commitment to purpose.



WHO WE ARE

Algas-SDI designs innovative gas vaporization and gas-gas blending solutions for a variety of fuels. Our products improve the reliability and productivity of users around the world. We hold ISO 9001 Registration and internationally recognized product certifications or approvals including FM, UL, CSA, CE, ATEX, DEMKO, PED and others.

Algas-SDI has developed and manufactures a complete line of liquefied gas vaporizers and heaters. We've also adapted vaporization technology from some of our many legacy products to serve the growing CNG and LNG transportable fuel markets. Our innovative design approach provides smaller footprints and enhanced, energy efficiency and greater reliability than conventional designs.

Algas-SDI is a worldwide organization with subsidiaries and distributors in more than 80 countries. Our headquarters are located in Seattle, Washington, with manufacturing located in Suzhou, China and Queretaro, Mexico. Our Denmark sales office serves Europe and the Middle East.



Algas-SDI

OUR STORY

Earliest years in California

Algas was founded in 1932 in Los Angeles, California. Operating as American Liquid Gas (Algas), the original company distributed bulk propane. Under the leadership of Harold W. Smith, Algas acquired Barton Brown Engineering in 1937. This acquisition fundamentally changed the corporate business model. This acquisition provided Algas a patent on one of the earliest propane carburetion systems for an internal combustion engine. With US Patent No. 2,188,072 as the seed, the manufacturing and engineering division of Algas began building automobile carburetion products and industrial propane standby systems.

Substantial growth occurred both during and after WWII. Growth was driven by the war effort and later by the post-war economic boom. In 1961, Algas was acquired by Union Oil which later became part of Chevron. The propane distribution business was absorbed within Chevron while the manufacturing division of Algas Industries was established as a free standing business. Around the middle of 1967, Algas Industries was sold to Cecil E Squibb and became part of Squibb-Taylor, Inc. and relocated to Dallas, Texas where it remained for nearly 20 years.

Г American Liquid Gas Corp 650 So. Grand Ave. Los Angeles, Cal. L 21 1931 AMOUNT PAID DETACH AND RETURN THIS BYUS WITH YOUR CHECK. RETAIN LOWER PORTION OF THE STATEMENT FOR YOUR REFERENCE. Rob't. D. Pearson, M. E. LOS ANGELES, CALIF. DATE NO. FÒR DR CR. 1924 SEARCH 1 1 Trade-mark "ALGAS" \$10.00 DEPARTMENT OF COMMERCE UNITED STATES PATENT OFFICE WASHINGTON MAR 1 1 1937 193 SIR: instrument will be recorded under date and returned within twenty days from record date. paid-sc By direction of the Commissioner. Very respectfully, J.A. Brear Chief Clerk.

In replying refer to letter No 166716

Americantia



A move to Texas and Mexico

In 1986, Algas Industries was acquired by HM International (HMI) of Tulsa, Oklahoma. Under HMI, distribution management of the auto carburation products for Latin America and manufacturing of most direct fired vaporizers were relocated to Queretaro, Mexico. Both business units operated under Algas Mexicana SA De Cv. Manufacturing of carburation products, however, remained in the USA. Those services were performed by PGI International of Houston, Texas.

In 1994, Algas Industries acquired the assets of International Gas Systems (Interex) of Mountlake Terrace, Washington. This acquisition facilitated Algas's expansion into Asia, Europe and the Middle East. In 1997, Algas Industries established a commercial office in Beijing resulting in a two fold increase in revenues.

In 1998, California based IMPCO, a global leader in carburation technologies, acquired the auto carburetion side of Algas Industries, including both manufacturing and distribution. This marked the end of Algas's participation in the automotive fuels sector.





Let's visit Seattle...

We've now told the first part of the Algas-SDI story. The second part of the story addresses the acronym 'SDI'. Sam Dick was a graduate engineer of the University of Washington. In 1958, he and a partner, Verle H. Brown, founded a mechanical contracting firm named E. Sam Dick Company. Verle was a graduate of the University of Utah, a survivor of the D-Day landing on Omaha Beach in 1944 and a trumpet player in a popular Seattlebased Big Band. The young firm was contracted in 1961 to supply part of the complex HVAC system used in the Space Needle. Constructed for the 1962 World's Fair, to this day, the iconic Space Needle defines the Seattle skyline.

In 1972 the company patented and introduced the world's first dry electric vaporizer naming it the Power[®] Series. This product forever changed the face of small to medium sized LPG vaporization techniques. Multiple national and international patents were immediately awarded. Innovation had become the company hallmark and remains today a defining trait of Algas-SDI.

In 1974 co-founder Verle Brown resigned to found his own firm, International Gas Systems or more informally, Interex. Around the same time, Newmark Brondt "Dane" Nelsen became a co-owner of Sam Dick's company. Experienced and well connected in the propane world from his previous ownership of Carroll Gas Company in Iowa, Dane would have an instrumental hand in the company's growth in the coming years.

Throughout the late 1960s and 1970s, E. Sam Dick Company had concentrated on supporting industrial and utility natural gas customers that faced natural gas curtailment or deliverability problems. In November of 1978, at the peak of the natural gas supply crisis, Congress enacted the Natural Gas Policy Act. Abruptly, the natural gas situation reversed from high demand and low supply, to high supply and low demand. The resulting 'oversupply' scenario impacted the industry from the supply side to the distribution side. The legislation also resulted in a corporate reorganization for E. Sam Dick Company. The company became Sam Dick Industries (SDI), and emerged with a modified business plan focusing on both domestic and international off-grid markets.

In 1979, Sam Dick Industries acquired Valiant Yachts, a brand of luxury sailboats designed by marine architect and Seattle icon, Robert Perry. That business was divested in 1983 to UniFlite and later acquired by Chris-Craft.

With boat building now in their past, the 1980's and 1990's remained growth years for SDI. The newly developed Power® Series horizontal and vertical electric vaporizers found great popularity, especially in Asia. As well, SDI was playing a pivotal role in providing many large scale CityGas SNG plants to So. Korea and China as their natural gas infrastructures were developing. In 1995, SDI was acquired by Eclipse Inc. of Rockford, Illinois.



The merger: Algas + SDI

In 1999, Sam Dick Industries, now owned by Eclipse Inc., and Algas Industries, merged to create Algas-SDI. Joining the two manufacturers proved to be an excellent strategic move. Algas-SDI soon offered equipment for digester gas, ultra-pure ammonia and related specialty applications. In early 2006, Algas-SDI acquired the direct fired vaporizer assets of Alternate Energy, a small firm located in the southeastern USA. This move complimented the earlier 1994 acquisition of Interex by Algas Industries.

With new and innovative patented products such as Zimmer^M, Second Sun^M, Torrexx^M and Hydrexx^M, manufacturing plants in China, Mexico and the USA, Algas-SDI is fulfilling the aspirations and hopes of the many people who have contributed so much to our corporate success over the last 80+ years. The combined firms stand today as a worldwide leading manufacturer of gas vaporization and gas-gas blending solutions.



Algas-SDI's branded products go to market via two internal groups: Distributed Products Group and Engineered Systems Group.

Distributed Products Group manages the application and sales of standard, "off-the-shelf", pre-engineered, small to medium capacity LPG products. These brands include:



This unique and patented electric vaporizer is the world's most popular vaporizer! It is ideal for restaurants, commercial kitchens, resorts, hog and poultry barns and similar applications.

Second Sun[®]

Our flameless catalytic tank heater safely and efficiently augments natural vaporization in propane, LPG and anhydrous ammonia storage tanks. Requires no external operational power!



(in state



In 1932, Algas-SDI patented the world's first direct fired vaporizer. Today it is the most commonly used LPG vaporizer in the world! Requiring no electricity, direct fired, open flame vaporizers are ideal for agricultural, construction and similar applications.

Hydrexx

Hydrexx offers an alternative to direct fired vaporizers where perceived safety, lack of 3-phase power or proximity of an open flame creates an application conflict. Heating can be via steam, process hot water or a packaged integral boiler.

Torrexx

Compact and 98% thermally efficient, Torrexx incorporates ALGAS-SDI's 30+ plus years of experience with electrically heated, dry, cast aluminum heat exchanger designs.



LPG VAPORIZERS

Algas-SDI has designed and manufactured some of the largest LPG vaporizers in the world. No competitor offers more worldwide experience or product options.



Aquavaire[®] Gas Fired Waterbath; QV and QH Series

These vaporizers satisfy the needs of the largest SNG utility peak shavers or CityGas systems and range to 15,000 US Gallons/h (28mt/h) in capacity.

Azeovaire[®] Steam/Water Heated; AW and AS Series

Excess steam or process hot water provide a practical and efficient approach to LPG vaporization. This product family employs vaporization techniques considered the safest in the industry.

Other vaporization options include both our multi-core Torrexx Electric Vaporizers and Hydrexx vaporizers.

The **Engineered Systems Group** designs and manufactures custom, semi-custom and specialty products and systems.

The markets we serve include SNG, CNG, LNG, biogas, NH3 and other gases. We design and manufacture a range of larger capacity, legacy LPG and SNG products. We also design and manufacture specialized products for CNG, LNG, biogas and specialty gas applications. The group is organized and staffed for project driven activities providing conceptual design thru commissioning. **Algas-SDI** designs and manufactures the most comprehensive line of SNG products and systems in the world. From heavily engineered on-site construction, to containerized, pre-packaged units—we meet your needs.

SNG SYSTEMS

SNG is a blend of LPG vapor and air mixed to allow interchangeability with natural gas. An SNG system represents to the natural gas grid user what a generator represents to the power grid user.

At their elemental level, both an SNG System and a generator are tools used when a planned or, more likely, an *unplanned* event interrupts the respective utility.

SNG systems serve a range of applications. For example, they provide back-up for industrial natural gas consumers. These are consumers who cannot tolerate a curtailment for either commercial or technical reasons. SNG systems also supplement an LDC's gas supply via peak shaving or commingling. In developing natural gas markets, SNG is often used prior to arrival of natural gas as a so-called "bridge fuel". This technique helps nurture load development for the natural gas infrastructure prior to arrival of the actual natural gas itself!

Contact us for more information on our extensive Venturi and Proportional SNG technologies.

Biogas

Wastewater treatment facilities often use digester gas to generate electricity. However, fluctuations in digester production can challenge continuous power generation. Consta-Mix supplements the digester gas with natural gas or propane blended with air to the appropriate energy value to match the digester gas. Based on pressure, Consta-Mix ensures stable, constant fuel delivery to the generator.

Other applications include landfill gas users, glass factory fore hearths and virtually any combustion process that benefits from uniform mixing and balanced heat distribution represent an ideal application.

Anhydrous Ammonia

Ultra-pure anhydrous ammonia is required to manufacture semiconductors and compound semiconductor devices. Algas-SDI is one of the very few manufacturers to serve this demanding market niche. Our Torrexx Ultra-Pure delivers consistent, high quality ultra-pure vapor and eliminates concerns of contaminant introduction during the vaporization process.

CNG/LNG

The Increasing use of CNG and LNG in off-grid applications requires the use of pressure reduction, gas heating and custody transfer capability. Algas-SDI offers various products to fill the needs of small to medium capacity users.

OUR HISTORY

1910 1925 Dr. Walter O. Snelling, a chemist for the U.S. Bureau of Mines, discovers propane.

5 U.S. propane sales reach 404,000 gallons annually.

"ALGAS"

1932

Algas is founded in Los Angles, California.



- 1932
 - Propane fuels the Olympic Village at the 1932 Olympics in Los Angeles.
- 1935 Algas contributes a section on fuel interchangeability to the *Butane-Propane Handbook*, 2nd Edition
- 1937 Algas acquires Barton Brown Engineering. A design and manufacturing division of Algas is created.
- 1939–1945 World War II escalates the needs for interchangeable fuels.
- 1945 U.S. propane sales reach one billion gallons annually.
- 1958 U.S. propane sales reach seven billion gallons annually.
- **1958** E. Sam Dick Company is founded in Seattle, Washington.



1961

1 Union Oil acquires Algas for its propane distribution business.

1961	Propane installations in the United States total 13 million
1966	Cecil Squibb and Squibb-Taylor, Inc. acquire Algas Industries from Union Oil.
1967-	1977 The Oil Embargo and inadequate natural gas distribution infrastructure results in extensive natural gas curtailment in the USA.
1974	Interex is founded in Mountlake Terrace, Washington.
1978	Congress enacts the Natural Gas Policy Act (NGPA). Large scale standby and peak shaving projects virtually cease overnight.
1979	E. Sam Dick Company reorganizes as Sam Dick Industries.
1983-	-1992 Sam Dick Industries sells 15 Iarge scale CityGas SNG plants in South Korea.
	a



- 1988 HM International of Tulsa, Oklahoma acquires Algas Industries from Squibb-Taylor.
- **1988** Sam Dick Industries sells first complete large scale CityGas SNG plant in China, PRC.
- **1988** The Liquefied Petroleum Gas Association name changes to the National Propane Gas Association.
- Algas Industries acquires the assets of International Gas Systems (Interex).

1995 Eclipse Inc. acquires Sam Dick Industries; SDI also obtains ISO 9001 Certification.



1999 Alg

Algas and SDI merge to become Algas-SDI with headquarters based in Seattle, Washington.



 $2002 \hspace{0.1 cm} \stackrel{\text{Algas-SDI introduces the Zimmer''}}{\text{vaporizer.}}$

 $2004 \hspace{0.1 cm} \text{U.S. propane sales reach 15 billion gallons} \hspace{0.1 cm} \\ \hspace{0.1 cm} (57,\!000,\!000 \hspace{0.1 cm} \text{m}^3) \hspace{0.1 cm} \text{annually.} \hspace{0.1 cm}$

- 2005 Algas-SDI relocates from Ballard to the Southpark neighborhood of Seattle. Manufacturing square footage is doubled.
- 2006 Algas-SDI acquires the direct fired vaporizer assets of Alternate Energy.

2006 Algas-SDI introduces the Torrexx" vaporizer.



2011

2011

Algas-SDI opens a manufacturing facility and Asia sales facility in Suzhou, China.

Algas-SDI introduces the Hydrexx™ vaporizer.

Algas-SDI introduces the Second Sun™ Tank Heater.

2012 Algas-SDI introduces the Zimmer II™

Trademarks and Patents

Algas-SDI holds or has pending, many US, European and Asian registered technology patents. These patents include but are not limited to 6816669, 6707987, 02734559.4, 10-0882382, 6957013, 03779340.3, 4667872, 2010-225074, 10-2005-7006945, 13/162363, and US2011/040686. The following are registered US Trademarks of Algas-SDI: Aquavaire*, Azeovaire*, Blendaire*, Power*, Vaporaire*, Stabilaire*, Algas*, Sam Dick Industries*. The following are Trademarks of Algas-SDI: XPV™, XPM™, QM™, Consta-Mix™, GA 500™, Filtaire™, GasPak™, Zimmer™, Torrexx™, Hydrexx™ and Second Sun™.





VAPORIZER MODEL SELECTION CHART

Chart shows 10-1650 GPH only; for larger capacities, contact factory.



GAL/h

Algas-SDI designs and manufactures a wide offering of vaporizers.

Our products utilize a variety of heat sources including electric, steam, circulating hot water, gas fired (direct), and gas fired (indirect) and catalytic heaters. This Selection Guide illustrates the available options and capacity ranges. For assistance, please contact Algas-SDI Customer Service or your local representative.

14

PARTIAL LISTING OF LARGE CAPACITY PROJECTS



DATE	COMPLETED PROJECT	COUNTRY	CAPACITY (MM BTU/HR)
1990	Kyung Nam City Gas	Korea	500
1990	Ulsan City Gas	Korea	400
1990	Choong Nam City Gas	Korea	300
1990	Kumi City Gas	Korea	150
1990	Kunsan City Gas	Korea	150
1991	Ulsan Energy	Korea	450
1991	Choong Nam Energy Co.	Korea	350
1992	Bariloche	Argentina	300
1992	Urumqi Gas Company	China	300
1992	Zhengzhou	China	250
1992	Dae Yang Eng	Korea	300
1992	Sempra Energy	USA	150
1994	Tianjin	China	300
1994	Shenyang	China	300
1994	Suzhou Singapore Ind.	China	150
1994	l Lung	Taiwan	150
1995	Xian	China	120
1995	Jianso-Yixing	China	130
1995	Wuhan	China	350
1995	Gas De Portugal	Portugal	30
1995	Gaseba	Uruguay	520
1995	Ft. Gillem Army Base	USA	600
1995	NRG Energy	USA	200
1996	Tongdewei	China	400
1996	Tianjin	China	120
1996	Huzhou City	China	240
1996	Fuyang City	China	30
1996	PSE Swar Station	USA	1600
1997	Jiangmun	China	56
1997	Shangdong Zibo	China	140
1997	Hainan	China	240
1997	Miyun	China	100
1997	Hefei	China	100
1997	Minnegasco-Lake Geneva	USA	400
1998	Jiangsu	China	21
1998	Baotou	China	150
1999	Baotou	China	260
1999	Liuzhou	China	280

DATE	COMPLETED PROJECT	COUNTRY	CAPACITY (MM BTU/HR)
1999	Tongshan	China	110
1999	Liuzhou	China	280
1999	Xuchang	China	270
1999	Shaoguan	China	280
1999	Minnegasco	USA	350
1999	SEA-3 Terminal (Tampa)	USA	1000
2000	Hutan	China	140
2000	Benhai	China	120
2000	Jintan	China	135
2000	Huadong	China	75
2000	Suzhou	China	320
2000	Chongming Gas Plant	China	70
2001	Temuco	Chile	100
2001	Huiyin	China	120
2001	Minnegasco Rum River	USA	800
2002	Temuco	Chile	130
2002	Kunming	China	200
2002	Nantong	China	340
2003	Suburban Refrigerated Term.	USA	300
2004	Oxigas	Mexico	60
2004	Oxigas	Mexico	130
2005	Rockgas	N Zealand	150
2005	Hawaii	USA	500
2006	Rockgas	N Zealand	150
2006	Tractebel Industrial	Peru	10
2006	Palm Jumeriah	UAE	250
2006	King County	USA	60
2008	Huntly Power Station	N Zealand	190
2008	Centerpoint Energy	USA	800
2008	Great River Energy	USA	810
2009	Basin Electric	USA	300
2009	National Grid Tilton Plant	USA	300
2009	Dominion Power Station	USA	415
2010	Golf Gardens	UAE	45
2010	Ft. Bening	USA	300
2011	Sowwah Island	UAE	156
2011	Marine Corps Base - 29 Palms	USA	400
2011	Duke Energy Gas Plant	USA	1037





Algas-SDI International, LLC

151 South Michigan Street Seattle, WA 98108 Tel.: (+1) 206.789.5410 Fax.: (+1) 206.789.5414 Fax

Algas-SDI Gas Equipment Suzhou Co. Ltd.

Changshu, Suzhou Jiangsu, China Tel: +86-512-6281-2955

Our products allow businesses located off the gas grid or under curtailment, to operate. We eliminate downtime ensuring workers can work and goods and services can flow to market.