



electronicsupdate

contents:

- 2 SunSource™ Solutions
- 2 Air Products Supplying Gadir Solar With Turnkey Contract
- 2 PV Chamber Cleaning Options: To Use NF₃ or to Use F₂?
- 3 Carlsbad Facility Captures EWA "Gold" Again
- 3 China Electronics Tradeshows Keep Good Customer Interaction Going
- 4 Chemical Week Honors Huck as SFO of the Year
- 4 Two ChemGuard™ Systems Bought by IMEC R&D Site
- 4 Air Products' PV Cost-Down Roadmap For Thin Film Si Photovoltaics
- 5 GASGUARD® Direct Blender Targets High-Volume Users
- 6 Two New XeCoverly® Offerings Target Aerospace, Lighting, and Laser Markets
- 7 Technical Papers
- 7 News of Interest

Air Products to Supply Bulk and Specialty Gases to CHINT Solar, Signs Letter of Intent with Best Solar

Air Products has signed a gas supply contract to provide bulk and specialty gases to CHINT Solar (Zhejiang) Co., Ltd. (CHINT Solar) at its new thin-film PV facility in Binjiang District, Hangzhou, China.

Also, China's Best Solar Hi Tech Co., Ltd, which is building a new thin-film PV facility in Nanchang City, Jiangxi Province, China, has signed a letter of intent (LOI) with Air Products for liquid bulk and on-site gases.



Thin-film solar panels manufactured with Air Products bulk and specialty gases.

The CHINT Solar contract calls for the supply of hydrogen, nitrogen, and argon, as well as specialty gases such as silane, NF₃, and dopant mixtures. CHINT Solar, a subsidiary of CHINT Group Corporation, is a producer of low-voltage electrical power transmission and distribution components. Specializing in the making of PV products, its annual production capacity of crystalline and thin-film PV is expected to exceed 300MW by 2010.

The LOI between Air Products and Best Solar is for the long-term supply of hydrogen, nitrogen, helium, and argon gases.

At full capacity, Best Solar's Nanchang facility will have an annual solar module manufacturing capacity of 330 MW at Phase 1, using amorphous silicon thin-film technology.

Late last year, Air Products signed a turnkey gas supply contract with Best Solar to provide on-site, liquid bulk gases, specialty gases, and gas equipment to its new thin-film PV facility in the Wuzhong Economic Development Park in Suzhou, Jiangsu Province, China. Suzhou capacity is also 330MW.

"Air Products is excited to be CHINT Solar's gas supply partner, and we look forward to applying our expertise in thin-film photovoltaic applications to help them quickly reach their goal of 210MW in thin-film PV by 2010," said

(continued on page 5)

Air Products Receives Safety Awards in China and Korea

Air Products China Electronics Operations team based in the Shanghai Wai Gao Qiao (WGQ) Free Trade Zone, China, received several awards from the local government bureaus in recognition of their excellent performance in safety and security management.

In Korea, Air Products' subsidiary, Air Products ACT Korea Ltd. received the "Five-Fold Nil Calamity" certification from the Korea Occupational Safety and Health Agency (KOSHA), the government agency for industrial safety and health.

The first WGQ award was the "2008 Safety/Security Advanced Group" honor presented to the WGQ site for obtaining good appraisal in five award criteria—Organizational Safety/Security Responsibilities, Vindicating Stabilization, Information Sharing, Safety Measures, and Policy/Regulation Fulfillment—as well as achieving high scores in all monthly inspections done in 2008.

This is the second award under this category that the WGQ site has received for its outstanding safety performance. The previous one was the "Qualified Safety/Security Company" award. The local police bureau presented the award during a visit when the bureau congratulated the team for its outstanding performance.

At the same time, the bureau also presented another award to Morgan Zhang, WGQ site manager, in recognition of his leadership in safety management practices, hazardous chemicals/toxic materials management, and overall site management.

(continued on page 6)



Employees of WGQ site are honored to receive the safety recognition.

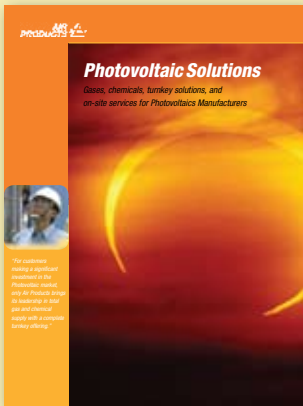


SunSource™ Solutions

Air Products has combined its PV manufacturing portfolio—from construction to production to expansion—into a single-source SunSource™ Solutions offering.

With SunSource solutions PV customers have access to a portfolio of gases, chemicals, equipment, on-site services, and project management experience that will help provide a faster ramp-up and grid parity for manufacturing operations.

See our comprehensive range of SunSource products and services for PV applications—
www.airproducts.com/sunsource.



Air Products Supplying Gadir Solar With Turnkey Contract

Air Products has signed a turnkey gas supply contract to provide liquid bulk and specialty gases, related gas distribution equipment, and engineering services to Gadir Solar at its new silicon thin-film PV facility in Puerto Real, Cadiz, Spain.

The contract calls for the long-term supply of nitrogen, hydrogen, argon, oxygen, and specialty gases such as silane, NF_3 , and dopant gases. Air Products also will install and operate the complete gas distribution systems from the source containers to the point of use.

Jeff Handelman, Air Products general manager, Photovoltaics, said: "Air Products is very excited to be working with Gadir as their gas supply partner. Gadir is a leader in the Spanish energy market and we feel our expertise and complete turnkey offerings will enable a fast ramp to meet Gadir's growth plans.

"Our cost roadmap and partnership approach allows customers to leverage our technology expertise, which includes everything from dopant blenders and gas cabinets to on-site services and a wide range of specialty gases, which includes our on-site fluorine and NF_3 solutions."

David Naranjo, CEO of Gadir Solar said: "We chose Air Products for their reliability, safety record, engineering expertise, and experience on the thin-film PV platform technology. We have aggressive growth plans and we feel Air Products is the right business partner to meet our needs."

Gadir Solar is part of a vertically integrated PV group, whose main objective is to reduce the production costs of PV electricity and achieve convergence with grid prices before 2013. Gadir Solar will produce, in a first stage, a 40 MW line of thin-film silicon based modules, with the intention of scaling the line into a 65 MW micromorph modules in 2010.

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PV Chamber Cleaning Options: To Use NF_3 or to Use F_2 ?

Regardless of what option you choose, Air Products is the only large-scale specialty gas producer offering high-volume PV manufacturing solutions for using either NF_3 or F_2 for chamber cleans.

We have nearly 30 years of experience in the large-scale production of both gases. We are the largest maker of NF_3 with multiple plants at Hometown, Pa. and a new production facility in Korea, and we are one of the largest manufacturers of F_2 with multiple plants at Hometown.

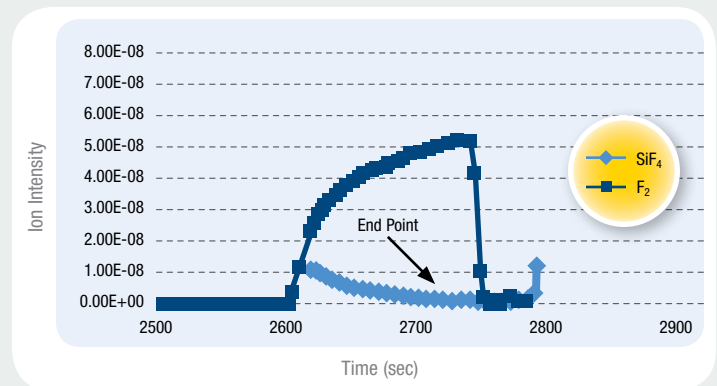
According to David Cooper, Air Products global NF_3 and F_2 product manager, the choice is based on many considerations.

" NF_3 has been used for more than 25 years in the global semiconductor and flat panel display industries and has proven itself to be the safest and most efficient chamber cleaning option," he said.

Designed to replace other gases that either result in remarkably high greenhouse gas emissions, or are extraordinarily dangerous to transport and handle, Cooper stressed that NF_3 continues to provide the low cost-of-ownership and low process risk that IC, flat panel, and PV manufacturers demand.

"Used in conjunction with a remote plasma source (RPS) and a high efficiency abatement system, emissions at the point of use can be reduced to below detectable limits. In addition to effectively eliminating emissions at our global transfilling facilities, efforts continue to capture and recycle rogue emissions at our US manufacturing plants which will further reduce emissions from production to approximately 0.5% by the end of 2009."

Pure fluorine, which cannot be transported in quantities above five pounds, must be produced on-site and offers significant risks, said Cooper, but it



Typical RPS-based NF_3 chamber clean has an emission profile.

can be made and handled safely with appropriate knowledge, designs, and operating procedures.

" HF , the feedstock for onsite F_2 , introduces significant hazards, for example, significant engineering controls need to be put in place to handle a leak. And due to its hazardous nature, on-site F_2 inventories must be kept to a minimum."

Listen to Dave Cooper's podcast and presentation "Chamber Cleaning Gases for the TF-PV Market" on our E-Learning Center:
www.airproducts.com/markets/elearning_center/index.asp.

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Carlsbad Facility Captures EWA “Gold” Again



A Carlsbad technician evaluates samples.

The Carlsbad ESM (Electronic Specialty Materials) facility recently received the Encina Wastewater Authority (EWA) “Gold Award” for perfect compliance with all pretreatment program requirements for this last year.

In order to receive the Gold Award, the Carlsbad ESM site passed annual inspections, met its discharge limits as demonstrated with no less than six wastewater tests annually, and submitted two semi-annual reports documenting compliance with their wastewater discharge permit. Pretreatment requirements protect the local marine ecosystem, ensure a clean wastewater system, and prevent wastewater plant operators from being injured due to toxic or potentially harmful substances.

Eileen Turner, Carlsbad ESM plant manager, said, “We are proud of all the employees at our Carlsbad facility for their focus on the environment and their attention to detail, and pleased that we have received this award again. This is just another example of how our Carlsbad employees live up to the company’s EHS Policy to be in compliance with all applicable environmental, health, and safety laws and regulations and to operate our plants and facilities in a manner that protects the environment and the health, safety, and security of our employees, contractors, and the public.”

Located in Carlsbad, California, the Encina Wastewater Authority provides wastewater treatment services to approximately 300,000 North San Diego County residents and local businesses. Encina’s state-of-the-art treatment facility is designed to treat 36 million gallons per day of wastewater to the secondary level—meaning the plant both removes solids from the waste and chlorinates the water to kill bacteria. As a result, most of the treatment plant’s wastewater is discharged into the ocean.

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Debbie Biggs, EWA compliance director; Trish Hannan, EWA board chair; Eileen Turner, Carlsbad ESM site manager; Kevin Hardy, EWA’s general manager; and Carlsbad employees Pang Tsui, Randy Skow, and George Henry celebrate the award win.



The Air Products SEMICON China booths are filled with customers who show great interest in our innovative solutions.

China Electronics Tradeshows Keep Good Customer Interaction Going

The China Electronics team met with customers at the co-located SEMICON / SOLARCON China tradeshows (Shanghai, China, March 17-19) to discuss how our offerings and experience can help them achieve sustainable success in good times and in challenging times. Both tradeshows were organized by SEMI, a global semiconductor industry association.

SEMICON China, celebrating its 21st anniversary this year, is a key semiconductor industry event for market players to network and learn about new technologies, products, and trends. It is also a good opportunity and effective platform for the China Electronics team to meet face-to-face and build relationships with customers from diverse geographic locations.

In view of the emerging China PV market, this year SEMI launched SOLARCON China, its first PV-themed tradeshow in China, in conjunction with SEMICON. To accommodate the concurrent events, SEMI increased the exhibition space to five exhibition halls, half a hall more than last year.

Though the visitor number (over 33,000) was down 15 percent from last year, it appeared that visitors’ enthusiasm and optimism remained strong toward the growth of China’s electronics market, which is helped by the China government’s initiatives to boost domestic demands and growing emphasis on PV.

At the SEMICON booth, one of the most discussed offerings was our XeCOVERY® xenon recovery system, a new onsite service with three different options that provides a lower cost-of-ownership for manufacturers using xenon in their process, which was also featured in some trade publications in the same period.

At SOLARCON, PV customers were keen to learn more about our turnkey solutions and also expressed great interest in our CHEMGUARD® CG 1000 Delivery System demo unit.

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Chemical Week Honors Huck as SFO of the Year

Chemical Week Magazine named Air Products Senior Vice President and CFO Paul Huck Senior Financial Officer of the Year at its 14th Annual SFO Conference held in New York City in June.

Huck also was the keynote speaker at the conference. His topic was “The Role of a CFO in a Turbulent Economy.”

Chemical Week’s SFO of the Year award acknowledges the senior finance executive who has made an outstanding contribution to business in the chemical industry through vision and leadership, corporate reporting and performance, quality of communication to stakeholders, social responsibility,

innovation, and global competitiveness. A survey of *Chemical Week* editors and industry analysts chooses the winner.

“Analysts cited Paul Huck and Air Products for a commitment to capital discipline, the strength of the company’s balance sheet, and the quality of financial reporting and investor communication,” said Robert Westervelt, *Chemical Week* editor-in-chief.

“I am delighted to receive this honor from *Chemical Week*, which is a reflection of my entire team’s dedication and passion to deliver value for Air Products’ shareholders,” Huck said.

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Two ChemGuard™ Systems Bought by IMEC R&D Site

By Sue Meola, Learning Performance Lead, Electronics Europe

Two Air Products ChemGuard™ CG500 chemical delivery systems have been purchased by IMEC, Leuven, Belgium, a long-standing customer of Air Products Electronics Europe.

“These units were the first of their type to be sold in Europe and so were ‘first time start ups’ for the Electronics Europe field service team,” said Nick Goodliffe, field service manager. The first installation challenges were dealt with professionally and efficiently by our team, which also commissioned them.”

IMEC is Europe’s largest independent research center in nano-electronics and nano-technology. More than 1,650 employees from around the globe work at IMEC’s R&D facility at Leuven.



From left, Michael Toeller (TEL, U.S.), Raf Rennen (IMEC), Satoshi Nakanishi (TEL, Japan) and Luca Ronzoni (Air Products collaborated on the IMEC installation and commissioning).

IMEC also required modifications to the standard CG500 unit. “They needed to operate without bulk containers, so process containers were installed that could be changed out on depletion, rather than being topped up from a bulk container. This added further challenges for the team with respect to commissioning,” noted Goodliffe.

Air Products’ chemical systems specialist Luca Ronzoni, based in Milan, managed the installation of the first chamber and received extensive advanced planning support from the Air Products’ U.S. product design team that overcame a number of challenges specific to “start up.” Ronzoni also worked closely with TEL, the Japanese manufacturer of the Trias tool set. ChemGuard™ Product Manager Chris Jaeger, said, “Being flexible, as Luca was, one of the key differentials that set us apart from our competition. The bottom line is that this was an outstanding performance and his efforts should be recognized. Also key to its success is Ton Wouda, Electronics Europe equipment regional marketing manager based at our Nijmegen Tech Center in The Netherlands.”

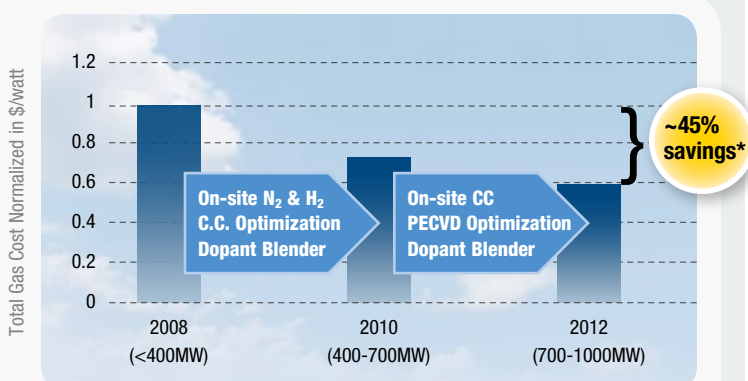
Raf Rennen, IMEC customer engineer said: “I am very satisfied with the work that Air Products has performed and I look forward to working with them again when we install the second chamber.”

Satoshi Nakanishi, TEL OEM tool manufacturer’s representative added; “Luca’s cooperation meant he was able to ensure that the commissioning was not delayed. We appreciate all of Luca’s effort in addition to his technical skill, work ethic, attitude and level of expertise during this commissioning.”

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Air Products’ PV Cost-Down Roadmap For Thin Film Si Photovoltaics

Air Products projects that its SunSource™ solutions for global PV manufacturers can reduce cost per watt by about 45 percent by 2012. This graphic is based on the latest process recipe roadmaps.



*Based on latest process recipe roadmaps

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Air Products to Supply Bulk and Specialty Gases to CHINT Solar, Signs Letter of Intent with Best Solar

(cont. from page 1)

Corning Painter, Air Products' vice president and general manager, Global Electronics Division. "Grid parity is key for the PV industry. Air Products continues to lower our customers' cost-per-watt through innovative technical, product, and equipment solutions."

Said Painter, "And, we are proud to again be selected by Best Solar to support its PV facility in Nanchang in addition to our turnkey gas contract for its Suzhous facility. It is a great testimonial of our supply capabilities and leadership position in the PV market. Our global PV business has shown great momentum, and we will continue to develop new offerings to meet the growing investments for PV markets."

Last year, Air Products won more than 20 new contracts in Asia serving both the crystalline and thin-film PV markets. "We are well positioned to meet the growing needs of our customers around the world, particularly in Asia," said Dave Tavianini, North America PV Business/Global marketing manager.

He noted that while the global economy still remains somewhat slow, the credit market is easing, which is no doubt helping PV manufacturers across the globe to initiate new projects or to expand existing operations.

"Germany appears to have the largest concentration of PV capabilities where between 50,000 and 60,000 are employed by the industry. PV is also strong in Turkey and Israel. Governments are backing PV because it creates jobs and is a very viable alternative energy option," added Tavianini.

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GASGUARD® Direct Blender Targets High-Volume Users

Yet another example of Air Products' commitment to lowering costs for electronics customers is the new GASGUARD® Direct Blender that leverages our own mixed gas production to create an on-site gas blender designed to dynamically blend dopant mixes at your site.

GASGUARD Systems Product Manager David Eshelman said the PV, IC, and flat panel industries all require large volumes of gas dopants for the epitaxial layer.

"Usually the dopants are mixed at ratios between 0.5% to 5% in hydrogen. As production ramps and gas flow rates increase, traditional gas supplies using cylinders or even a supply of 'Y'-sized (40.5 M³) cylinders of the gas mix are a challenge due to cylinder handling, space requirements, and inventory costs."

"We say, why not move the manufacture of the dopant mixtures from the specialty gas plants right to the customer site," said Eshelman.

The Direct Blender consists of equipment that makes the mix, and precludes handling large amounts of cylinders on-site, making it more cost-effective.

Pure dopant is contained within the blender module. The pure dopant cylinder feeds gas into the mixing panel, which then blends the dopant gas with on-site hydrogen to the pre-defined mix ratios. The integral analytical system validates and dynamically adjusts the blend accuracy, real time. The mixed gases are then stored in the surge tank or day tank located nearby. If the delivery gases begin to go off spec, the integral analytical system adjusts the mix to maintain blend tolerance.

Eshelman said an advantage of this integrated all-in-one system over an alternative separate blender and analytical system is that both the mixing process and the continual analysis controls the blend. This also makes the system more cost-effective since one controller drives it.

"The system is a smaller scale replica of Air Products' own dynamic blend production plant located in Choeran, Korea. The Direct Blender is designed with real world, production experience," he added.

According to Bob Ford, Bulk Specialty Gas System (BSGS) commercial manager, the Direct Blender is part of BSGS's evolution, which Air Products pioneered, to supply larger volumes of specialty gases.

"Our latest approach to improve the costs position for our customers is to again use its specialty gas plant experience to move larger volumes of specialty gases with on-site dynamic blending. The blender can take advantage of the fact that on-site hydrogen is already available to make the mix and the only other ingredients are the pure dopant, the dynamic blending equipment, and the expertise to operate and maintain the system to run reliably," explained Ford.

Dopants are what chemists call hydrides and are very reactive, said Ford. They have a limited shelf life once they are mixed in a steel cylinder. Yet, dopant blends are primarily a hydrogen base gas at 99% composition, so the active dopant ingredient is only a small proportion of the total volume.

"Transporting compressed cylinders consisting mostly of hydrogen is not cost-effective. And, these mixes are expensive. The Direct Blender takes advantage of the cheaper bulk hydrogen source at the customer's site. That, combined with lower transportation costs, saves money," said Ford.

Eshelman stressed, "This total solutions approach is what made Air Products the global leader in BSGS supply. By taking the approach to own, operate, and maintain the blender system, Air Products can provide the same guarantee of quality, safety and reliability that BSGS is also known for.

"So the choice is simple: handle too many cylinders of an expensive mixed gas that has limited shelf life, or get the same product made fresh as needed, where needed."

To hear the full podcast, go to www.airproducts.com/markets/electronics/elearning_center/index.asp. For additional info, visit www.airproducts.com/Electronics/gasguard_direct_blender.htm.

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The Direct Blender cabinet houses the dopant source cylinder, PLC controls and the QC analytical, but it's not much bigger than a three-cylinder gas cabinet.

Two New XeCovey® Offerings Target Aerospace, Lighting, and Laser Markets



electronicsupdate

Two new versions of the Air Products' XeCovey® xenon recovery system have been introduced to target the aerospace, lighting and laser markets. Building upon the success of our initial XeCovey xenon recovery offering, which targets the semiconductor and MEMs industries, the company's new Mark II and Mark III systems have been developed to handle larger volumes and higher concentrations, respectively, of this valuable rare gas.

The XeCovey xenon recovery service is an on-site offering that extracts xenon from process effluent streams. An enriched mixture of recovered xenon is compressed and stored. Full vessels are then transported offsite for distillation.

Air Products assumes responsibility for owning, operating, and maintaining the units placed at a site, which limits a customer's investment only to costs associated with installation and utilities to operate the equipment. The high xenon recovery rates can translate into savings of more than 50 percent of a customer's xenon costs at current market prices.



Our XeCovey Xenon Recovery Service offering.

The Mark II system is a larger version of the original package that is able to address simultaneous recovery of xenon from multiple process reactors. This means the Mark II system can process volumes of xenon in excess of 100,000 liters/year at a customer site using a single equipment package.

The Mark II unit is equipped with stream selection logic that enables Air Products to acquire xenon only from the processes that use it.

"The Mark II enables maximum process flexibility and minimizes the overall volume of gas we need to eventually move off a customer's site," said Gene Karwacki, commercial development manager for XeCovey at Air Products. "This advancement in our equipment package design helps us reduce the overall footprint for the equipment we need to install onsite."

Since introducing the XeCovey service, Air Products has also seen interest in adapting the service to a variety of other applications that use xenon in both large and small volumes.

These include lighting, aerospace, and materials processing. To address the needs of users of higher concentrations of xenon, Air Products developed the Mark III system. The addition of the Mark II and Mark III to Air Products' portfolio broadens the service offering to a large cross-section of the xenon market.

To hear more about the xenon market, and how our XeCovey services can help your process, go to www.airproducts.com/xecoveypodcast.

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Air Products Receives Safety Awards in China and Korea

(cont. from page 1)

In addition, the team won the "Safety Production Self-discipline Corporation" award from the Pudong New District Safety Supervision Bureau.

Criteria for winning this award included gaining a good rating in three categories—safety management practices, hazardous chemicals/toxic materials management, and overall site management—as well as achieving high scores in all the quarterly inspections done in a year.

Only five among the thousands of companies located in the WGQ Free Trade Zone won this award. In winning this award, the WGQ site will be exempted from quarterly inspections and surprise audits conducted by the bureau during 2009-2010.

This is the third consecutive time the team has received this award, which it won for 2005-2006 and for 2007-2008.

The Shanghai WGQ site houses the Electronics Operations Technical Center, electronics materials warehouse, and a high purity nitrogen plant that supplies gaseous nitrogen to electronics customers in the industrial park.

The "Five-Fold Nil Calamity" certification from KOSHA is a significant award. A one-fold period is 380 days without loss time incident (LTI), and Air Products ACT Korea Ltd. has achieved 1,900 incident-free days, which is a five-fold period, as of October 9, 2008.

KOSHA has a strict requirement to confer the Nil Calamity certification. It includes inspection of documentation and procedures for work site safety.



Employees of Air Products ACT Korea Ltd. are honored to receive the safety recognition.

The certification is presented only when a company passes inspection on all the processes and no issues are identified in the work environment.

The achievement was a result of high level of safety performance, which in turn was enabled by the excellent teamwork, and strong commitment of our employees. The team is committed to reaching the next safety target—the greater milestone of "10-Fold Nil Calamity" certification.

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TECHNICAL PAPERS:

The following technical papers were recently approved for publication and/or presentation:

A. Wu, M. Rao, E. Baryschpolec, M. Schaller, C. Bartsch, S. Leppack and A. Ott, **"Development of Compatible Wet Clean Stripper for Integration of CoWP Metal Cap in Cu/low-k Interconnects,"** Sematech Surface Preparation and Cleaning Conference, Austin Texas, March 2008.

D. Tamboli, M. Rao, and G. Banerjee, **"Challenges in Post CMP Cleaning for Advanced Technology Nodes,"** 215th Conference of the Electrochemical Society, May 2009.

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news of interest:

Air Products Initiates Gas Supply Contract With Taiwan's Green Energy Technology (GET)

Air Products has begun supplying bulk and specialty gases to Taiwan-based solar energy company Green Energy Technology's (GET) new thin-film (PV) production facility in Kuanyin Industrial Park, Taoyuan, Taiwan.

The contract between Air Products and GET calls for long-term supply of nitrogen, as well as silane and the requisite gas delivery equipment and piping.

GET has built a generation 8.5 large-sized thin-film PV plant in Kuanyin Industrial Park. By leveraging the TFT-LCD experience of its affiliate company, Chunghwa Picture Tubes—the fifth largest TFT-LCD supplier worldwide—GET began thin-film line mass production in December 2008.

GET plans to reach an annual capacity of 30MW in the first quarter of 2009 and reach 50MW by the end of 2009.

"Air Products is very excited to be working with GET as their gas supply partner, and we feel our expertise and complete turnkey offerings will enable a fast ramp up to meet the company's

growth plans," said Corning Painter, Air Products' Taiwan-based vice president and general manager, Global Electronics Division. "We continue to work on new offerings to drive down our customer's cost per watt with innovative technical, product and equipment solutions. We are also positioned to meet the growth needs of our customers around the world, especially in Asia.

"Our strong supply position in the TFT-LCD market, coupled with our comprehensive low-cost, turnkey offerings specifically designed for PV customers, has enabled Air Products to grow with this emerging industry," added Painter.

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Air Products' PV Research Proposal Wins DOE Funding

An Air Products research project has been awarded \$1.58 million under the U.S. Department of Energy's Photovoltaic Supply Chain and Cross-Cutting Technologies program created to identify and accelerate the development of unique PV products or processes that will impact the solar industry.

The program supports the goals of DOE's Solar Energy Technologies Program (SETP).

Air Products proposes R&D focused on accelerating widespread commercialization of clean solar energy technologies. Its main objective is to develop and validate an advanced RF plasma CVD process, said Project Director Patrick T. Hurley. The specific program title is "Enhanced Growth Rate and Silane Utilization in Amorphous Silicon and Nanocrystalline-Silicon Solar Cell Deposition via Gas Phase Additives."

"This process will be used to achieve deposition of a-Si and nc-Si films for solar cells at increased growth rates and reactant utilization, which can be directly incorporated into manufacturing facilities for early deployment," he added.

Hurley said that once developed and commercialized, these additives could be used by all thin-film silicon manufacturers whose production is expected to grow to greater than 5 GW in the next several years. "If 5 GW of TF-Si manufacturing were to adopt these additives and save about \$0.115 per watt, it would save the PV industry some \$600 million annually."

The Air Products research also involves the University of Delaware (Drs. Steven Hegedus and Ujjwal Das). It is among 24 new PV Supply Chain and Cross-Cutting Technologies projects receiving \$22 million, an investment that is part of the \$117.6 million in American Recovery and Reinvestment Act funding announced in May 2009.

The funded projects range from automated assembly to semiconductor fabrication and target manufacturing and product cost reduction with the potential to have an impact within two to six years on a substantial segment of the PV industry.

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VaporGuard® Temp Control System New EES Offering

The VaporGuard® Temperature Control System is the latest addition to Air Products' state-of-the-art on-site fab distribution equipment for gases and chemicals offered by our Electronics Equipment Solutions (EES) group.

Chris Jaeger, ChemGuard product manager, said the VaporGuard system is the next generation controller in the successful temperature control system that also includes the Absolute Temperature Control System (ATCS).

"The VaporGuard system provides accurate and stable temperature control for chemicals. It's available in six different models to control temperature ranging from 10° to 115°C," said Jaeger.

The new system seamlessly replaces existing temperature controllers. "We have implemented several technology advancements to improve transient, step- and steady-state temperature responses, and a number of other key features of our ATCS unit."

For more information on the new VaporGuard Temperature Control System visit www.airproducts.com/Electronics/vaporguard.htm.

For information on our complete line of equipment, visit www.airproducts.com/Electronics/equipment.htm.

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summer 2009

tell me more
www.airproducts.com/electronics

company information

Air Products serves customers in industrial, energy, technology and healthcare markets worldwide with a unique portfolio of atmospheric gases, process and specialty gases, performance materials, and equipment and services. The company has annual revenues of \$9 billion, operations in over 40 countries, and over 20,000 employees around the globe.

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