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Winter Newsletter 2014

FALL 2014 DIRECTOR'S MESSAGE

Dear ISA Chemical and Petroleum Industries Division Member:

ChemPID Leaders

After 3 years as the ChemPID Newsletter Editor, Rhonda Pelton has accepted the role of ChemPID Director-Elect. Rhonda is a graduate of Prairie View A&M University, and a Process Automation Manager for Dow Chemical, based in Houston, TX.

We welcome Rafia Noor as our new Newsletter Editor! Rafia is an Automation Application Specialist at Occidental Petroleum Corporation in Houston, TX. Rafia has a B.S. Electrical Engineering from the University of North Texas at Denton, TX. Rhonda will be working with Rafia to continue the great newsletters our membership has received in the past.

Symposiums

The first ISA Process Control and Safety Symposium (PCS) was held in Houston, TX on October 6-8, 2014, and is the start of something great! The ISA Process Measurement and Control Division, the ISA Safety and Security Division, and Chemical and Petroleum collaborated to host this symposium. Approximately 200 engineers attended.

On the ChemPID track, Eloise Roche had well attended presentation on Safety Instrumented Systems (SIS). Eloise is a Global SIS Process Automation Lead for Dow Chemical in Freeport, TX. The High Performance Graphics Roundtable was also well attended and ChemPID is looking forward to continuing the robust roundtable discussions in the next PCS Symposium.

ChemPID gives a special thanks to Chad Harper (ChemPID Symposium Contact) and Alan Bryant (ChemPID Associate Director) for their hard work and long hours of volunteer time to make ChemPID's contribution to the PCS Symposium a success!

Scholarships

In conjunction with the PCS Symposium in Houston, ChemPID launched its annual student scholarship program targeting students in the Houston area, pursuing an education, leading to a career in Process Control industries. Five \$2,000 scholarships were awarded this year. This first year, ChemPID targeted applicants in the Houston, Texas area. However the program will be expanded to align with our vision to reach students across the globe. If you are a member and have a passion for helping students please contact ChemPID for more information on how you can get involved.

ChemPID congratulates the 2014 Student Scholarship Winners, in alphabetical order by last name:

- 1) Lance Drake, Lee College, Baytown, TX
- 2) Grant Foster, Houston Community College, Houston, TX
- 3) Craig Harrison, Houston Community College, Houston, TX
- 4) Robert Hite, Lee College, Baytown, TX
- 5) Joseph Lopez, Houston Community College, Houston, TX

Respectfully,
Matthew Conklin, Director ISA Chemical and Petroleum Industries

ISA CALENDAR AND UPCOMING EVENTS

ISA Food and Pharmaceutical Industry Division Symposium 2015

Tuesday, 10 Feb - Wednesday, 11 Feb, 2015
1201 Sumneytown Pike, PO Box 900 Spring House, PA 19477

ISA 60th Analysis Division Symposia

Sunday, 26 Apr - Thursday, 30 Apr, 2015
5700 Seawall Blvd Galveston, TX 77550

ISA 2015 Water Wastewater and Automatic Controls Symposium

Tuesday, 04 Aug 2015
Lake Buena Vista, Florida

International

ISA99-IC32: Using the ANSI-ISA99 standard to secure your control system

Thursday, 27 November 2014 8:00 AM - Friday, 28 November 2014 4:30 PM
The Hague, The Netherlands

Batch control using the ANSI-ISA-88 standards ISA88 - IC40

Monday, 08 December 2014 8:00 AM - Wednesday, 10 December, 2014 4:30 PM
Eindhoven, The Netherlands

Using the ANSI-ISA99 standard to secure your control system ISA99-IC32

Sunday, 14 December 2014 8:00 AM - Monday, 15 December 2014 4:30 PM
Kuwait City, Kuwait

The Automation Legal Reference:

A guide to legal risk in the automation, robotics and process industries

Author: Mark Voigtmann



“The best way to approach risk management in automation is to treat such projects as a very specialized type of construction project.” So observes author

Mark Voigtmann in the opening pages of this concise but insightful book which sets as its goal nothing less than bridging the gap between the legal profession and those who work

in the automation, robotics, and process industries. Among the topics covered: • The Dirty Dozen Contract Clauses • Automation Standards • Specifications • Intellectual Property • Professional Licensing • Insurance

Get Published: Author an ISA Book

ISA Books is committed to the highest quality standard publishing. If you would like us to consider your idea for a book, or if you are interested in contributing to an ongoing ISA Books project, ISA Books is interested in hearing from authors who are subject matter experts in the following areas:

- Maintenance/Repair
- Motion Control
- Wireless
- Lean Manufacturing
- Optimization for Instrument and Control Systems

If you are interested in contributing to these important topics, please send a letter of interest and a resume to:

Manager, Publications Development
ISA
67 Alexander Drive
P.O. Box 12277
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Find out more about the process of becoming an ISA author at:

<https://www.isa.org/isa-publications/become-an-isa-author/>

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INTECH PLUS, ISA'S MOBILE APP INTRODUCED EARLIER THIS YEAR, WINS 2014 AMERICAN GRAPHIC DESIGN AWARD

Research Triangle Park, North Carolina, USA (24 September 2014) - The International Society of Automation (ISA) today announces that InTech Plus, the company's new mobile application for the Apple iPad that provides on-the-go technical and educational content, has received a prominent design award.

Graphic Design USA has awarded ISA a Certificate of Excellence award in its 2014 American Graphic Design Awards

competition for the online design of InTech Plus, which ISA launched earlier this year to connect automation and control professionals to an array of new and different automation-related information and functionality.

For five decades, Graphic Design USA has sponsored competitions to showcase excellence among professionals in creative fields. Only 15 percent of the entries in the 2014 American Graphic Design Awards competition - which this year attracted more than 8,000 applications - received Certificate of Excellence Awards.

"ISA is very pleased and excited to be presented with this prestigious design award," says Susan Colwell, Manager of ISA Publications Development. "InTech Plus reflects ISA's commitment to innovation and the 'coolest delivery' of new tools, products and programs for automation professionals. The fresh and modern design of the application plays an essential part in our ability to deliver engaging content in a new and compelling way."

Winning American Graphic Design Award entries are featured in Graphic Design USA's 250-page annual publication (and digital flipbook version), Annual Winners Gallery website section, and annual iPad app.

More about ISA's InTech Plus

InTech Plus, downloadable free of charge to ISA members and non-members, was developed by ISA to

deliver interactive content and tools - anywhere and at any time - in a new and appealing format.

From the latest technology news and 'how-to' videos featuring ISA subject matter experts to Q&As, quizzes and calculators, the application supports ISA's commitment to innovation and to better serving the needs and wants of all automation and control professionals.

InTech Plus content is derived through a variety of authoritative sources, most significantly through the insights and perspectives of ISA's world-renowned subject matter experts. In addition, the entire spectrum of ISA's products and services - including its automation standards; education, training and certification programs; technical symposia; publishing resources and leadership development capabilities - is represented. While InTech Plus is currently only offered for the iPad, additional formats are under development.

Download InTech Plus for free through the Apple App Store at <http://www.apple.com/itunes/>. For more information about InTech Plus, contact Susan Colwell at +1 (919) 990-9305 or through email at scolwell@isa.org.

More about the American Graphic Design Awards™ Since 1963 Graphic Design USA has been the news magazine for graphic designers and other creative professionals.

For nine straight years, the magazine's American Graphic Design Awards™ competition has attracted more than 8,000 entries. The competition is open to everyone in the community: advertising agencies, graphic design firms, corporate, institutional and publishing in-house departments, and more. It honors outstanding new work of all kinds: print, packaging, point-of-purchase, internet, interactive and motion graphics.

<https://www.isa.org/news-and-press-releases/isa-press-releases/2014/september/intech-plus-isas-mobile-app-introduced-earlier-this-year-wins-2014-american-graphic-design-award/>

The Impact of Shale Gas on Chemical Industry Jobs

Selected excerpts from American Chemistry Council report: **“Shale Gas, Competitiveness, and New US Chemical Industry Investment: An Analysis Based on Announced Projects”**

A New Competitive Advantage for US Chemical Manufacturers

A new competitive advantage has emerged for chemical manufacturing in the United States as vast new supplies of natural gas from largely untapped shale gas resources, including the Marcellus along the Appalachian mountain chain, are leading to massive capital investment and expansion of the US chemical industry. With the development of new shale gas resources, US industry is announcing expansions of capacity, reversing a decade long decline and providing opportunities for new jobs at a time when the United States is facing persistent high unemployment. This report presents the results of an analysis that was conducted by ACC to quantify the economic impact of the significant investment and additional production in the US

chemical industry stimulated by the increased availability of low cost natural gas and the resulting gain in competitiveness.

The US chemical industry is the largest industrial consumer of natural gas for fuel and power and also for feedstock. The economic impact of the additional production in the US chemical industry invigorated by improved competitiveness resulting from an increase in the availability of low cost natural gas is game changing. Based on actual project announcements through March 2013, the US chemical industry is expected to spend at least \$71.7 billion in private capital investment on new plant and equipment by 2020, to capitalize on the renewed competitiveness brought about by the shale gas revolution. Further, we expect that additional unannounced investment in chemical capacity is likely to occur. As much as \$82.4 billion may be invested in new chemical industry capacity by 2020.

Read the complete analysis:

<http://chemistrytoenergy.com/sites/chemistrytoenergy.com/files/shale-gas-full-study.pdf>

Economic Impacts During the Investment Phase (Temporary) (2010-2020)					
Chemical Industry Investment (Projects announced through March 2013)	Direct Jobs*	Indirect Jobs*	Payroll-induced Jobs*	Total Jobs*	Federal, State and Local Tax Collections
\$71.7 billion in chemical industry investments (97 projects) to build and/or expand in the U.S. will generate...	485,000 jobs in construction and capital goods manufacturing, i.e., process equipment, tanks, pipes, valves, etc.	258,000 jobs in firms along the supply chain, i.e., firms that supply materials, equipment, and services to contractors involved in the build-out.	Workers in direct + indirect industries will earn payrolls totaling \$47.1 billion. Their household spending in their communities will support 442,000 payroll-induced jobs	1.2 million	\$20 billion
<small>*Because the investment occurs over a multi-year period, jobs should be interpreted as work-year jobs. This is done to avoid double-counting the same job in multiple years.</small>					

Economic Impacts From Increased Chemical Industry Output (Permanent) (By 2020)					
Increased Chemical Industry Output	Direct Jobs	Indirect Jobs	Payroll-Induced Jobs	Total Jobs	Federal, State and Local Tax Collection
The \$71.7 billion in announced chemical industry investments will lead to \$66.8 billion in increased chemical industry output. This is a 9% gain above what output would otherwise be in 2020.	The \$66.8 billion in new chemical industry output will require more chemical industry workers, creating more than 46,000 direct chemical industry jobs.	The \$66.8 billion in new chemical industry output will generate purchases of raw materials, equipment, and services in the supply chain, creating 264,000 indirect jobs. Added output of these supplier sectors will lead to an additional \$100 billion in indirect economic output.	The 310,000 direct + indirect jobs will earn payrolls totaling \$23.8 billion. Household spending by these workers in their communities will support an additional 226,000 payroll-induced jobs.	537,000	\$14 billion

Exploring the Global Shale Gas Initiative—Potential opportunities for ISA

By [Peggie Koon](#), President of ISA 2014
Published in *ISA Insights*, June 2014

If you look at any of the reports on energy or happen to browse the Energy Information Administration's (EIA) website (www.eia.gov), you will see a large number of links to articles about the rapid growth of **shale gas** and tight oil. In fact, President Obama, in his State of the Union address, talked "about the role shale gas can play in providing clean, reasonably-priced domestic energy." But shale gas is not just a game changer for the US; globally, the rapid growth of shale gas production has tremendous implications for energy production and consumption.

At the ISA Executive Summit held in Greensboro, NC earlier this year, Society leaders identified the growing global demand for energy as one of 10 game changing trend rivers impacting the future of the automation industry and ISA. We also recognized the rapid growth of shale gas, its impact on the cost and consumption of natural gas, and the potential shale gas opportunity for ISA. In this article we will review basic **shale gas** concepts, take a look at the global opportunity, touch briefly on new technologies being used, and look at environmental impacts. Finally, we'll pose a few questions: How might ISA engage with this industry/market? Are there potential training and/or workforce development opportunities for ISA related to shale gas or other unconventional energy resources? What else might ISA do?

What is shale gas? According to the Energy Information Administration or EIA, **shale gas** is the combination of hydraulic fracking and horizontal drilling has transformed organic-rich shales that were previously unproductive into some of the largest, most productive natural gas fields in the world.

"The [Marcellus Shale](#), [Utica Shale](#), [Barnett Shale](#), [Eagle Ford Shale](#) and [Bakken Formation](#) are examples of previously unproductive rock units that have been converted into fantastic gas or oil fields by hydraulic fracturing."
www.eia.gov



What shale gas resources are available globally? Advanced Resources International, Inc. (ARI) was commissioned by the Energy Information Administration (EIA) to complete an initial assessment of international shale gas resources. The report looked at almost 70 shale gas formations in 48 basins located in 32 countries and **showed reserves of 6,622 trillion cubic feet of technically recoverable shale gas in the 32 countries analyzed.** The map below shows the location of these basins and the regions analyzed in the study. For the full report, go to: <http://geology.com/energy/world-shale-gas/>.

Why is this important? Why should you care? Here's a fast fact to remember: According to the EIA, just 1 trillion cubic feet of natural gas is enough to heat 15 million homes for one year, generate 100 billion kilowatt hours of electricity, or fuel 12 million natural-gas-fired vehicles for one year.

And by 2035, the EIA projects that shale gas production will rise to 13.6 trillion cubic feet, representing nearly half of all US natural gas production. (www.eia.gov)

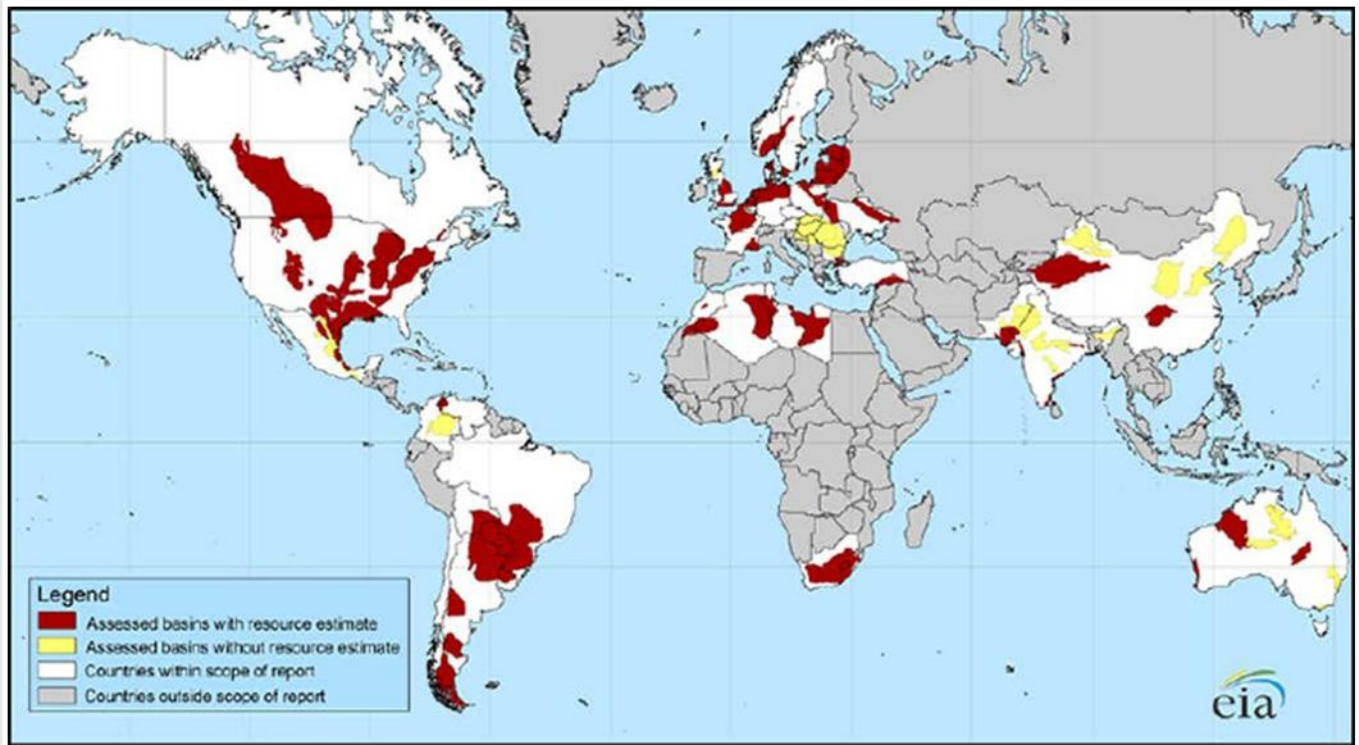


Figure 1. U.S. liquid fuels supply, 1970-2035 (million barrels per day)

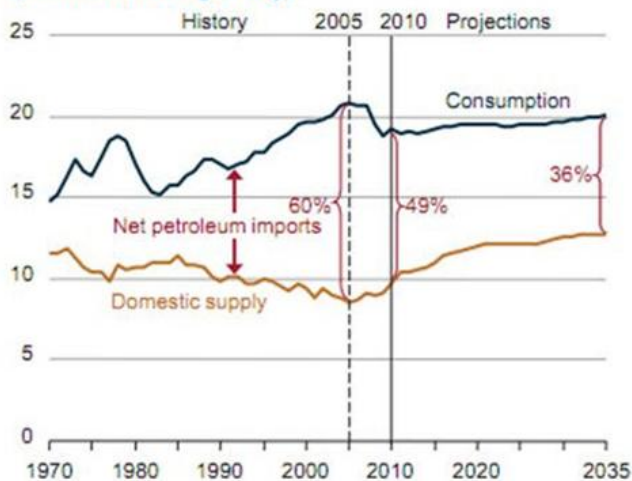
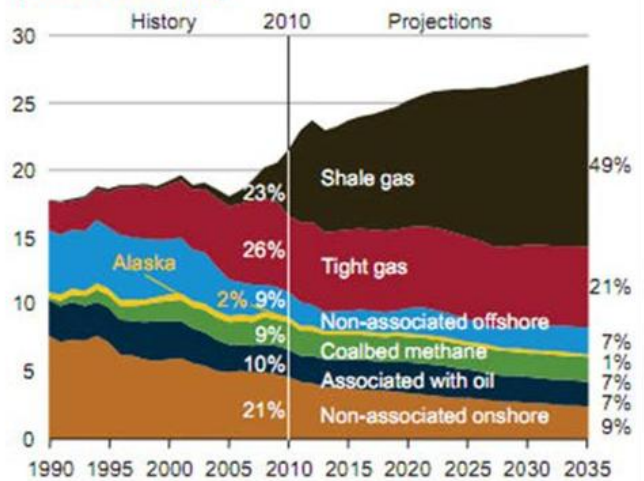


Figure 2. U.S. natural gas production, 1990-2035 (trillion cubic feet)



What new shale gas technologies are available related to hydraulic fracking?

In April of this year, I attended the NAE-AAES Convocation of Professional Engineering Societies in Washington, DC. In his presentation, [Dr. Jeff Spath](#), 2014 SPE president, Schlumberger Limited, talked about new technological advances for unconventional energy resources, including:

- **Wellbore Placement & Geologic Steering** – Technology has taken us from geometric

to geologic forms of drilling, optimizing drilling of the well to the “sweet spot” using geologic steering

- **Electromagnetic look ahead drilling** – Allows us to look ahead of the drill bit 10 to 60 feet away
- **Multi-stage fracturing** – Allows us to increase contact between the well and flow from 315 sq. ft. to 160K sq. ft. using single

stage fracking to 2.4M sq. ft. with Multi-stage fracking

- **Micro seismic monitoring/interpretation**
– Allows us to listen to the horizontal wells fractured, gives us an acoustic measurement plus visualization of the fractures, and allows us to optimize the way we take advantage of the flow.
(<https://www.nae.edu/File.aspx?id=113225>)
The technology combines subsurface sensors with powerful data collection and analysis software to record the myriad of tiny microseisms (or micro earthquakes) that occur as fluid is pumped into a well bore, splitting or fracturing the subsurface rock formation holding the natural gas or oil. The individual locations of these micro seismic events are mapped to create an image of the fracture locations. To monitor each of these small events, high detection sensitivity devices are used. In addition to improving efficiency, the use of these systems also allows us to reduce the environmental impact of fracking.
(<http://www.ussensorsystems.com/oil-hydro.html>)

Another hot topic of discussion was the potential use of liquid CO₂ to replace water in the fracking process. [Mr. C. Michael Ming, P.E.](#), general manager, Oil & Gas Technology Center, GE Global Research, spoke to us about Unconventional Resources & State of R&D. Michael said we are in “the Age of Gas,” stating that natural gas is taking a larger role in the global energy mix because it’s affordable, reliable, and dispatchable. He talked about the research and development effort that is taking in place in these areas using technologies that are better, cheaper, faster, safer, cleaner, and smarter:

- Production Systems
- Well Construction
- Energy Systems
- Water Treatment
- CO₂ EOR & Fracturing (enhanced oil recovery and to replace water in fracturing)
- 4. Water Use – Excessive use of water in the fracking process is a drain on resources.
- 5. Surface spills – Waste from fracking can affect ground water.
- 6. Recycling Risks – Due to storage, new forms of transportation, handling of residual waste streams, there are recycling risks.

See the presentation at:

<https://www.nae.edu/File.aspx?id=113229>.

Recently, GE, which is studying the issue under a \$10 billion research program, stated that “carbon dioxide, used for years to force crude oil out of old wells, likely will not replace water in fracking anytime soon because of technical challenges and limited infrastructure”.

GE is making a push into oilfield technology and is studying how a chilled form of CO₂ known as a “super- critical fluid”—which is neither a liquid nor a solid—could be used as the new industry standard for hydraulic fracturing, (or fracking). The company is working on the project with Norwegian oil and gas producer Statoil ASA as part of GE’s ecomagination program, a program that focuses on gas turbine efficiency, wind blade design and other energy projects.

(<http://www.reuters.com/article/2014/04/07/general-electric-fracking-carbon-idUSL1N0MT1HN20140407>)

What about shale gas production and the environment?

[Mr. Scott Anderson](#), senior policy advisory, Environmental Defense Fund, talked about eight risk areas associated with hydraulic fracking. The eight risks mentioned were:

1. Well integrity – There are 136 elements critical to well integrity. Lack of well integrity can pollute water or cause leaking to the environment during construction and for lifetime.
2. Induced Seismicity – Fracking can cause earthquakes. The earthquakes are caused by injection of fluid (resulting in 40 x increases in earthquakes that measure 4.0 on the Richter scale) and 2.0 quakes.
3. Surface erosion – Fracking causes erosion of the soil.
7. Air quality – While clear methane emissions are not so high to affect greenhouse advantages, air toxins, and fugitive methanes are by products of fracking.
8. Infrastructure environmental impact – There can also be increased noise, dust, increased traffic, traffic congestion, and related fatalities.

(<https://www.nae.edu/Projects/Events/71511/113103/113105.aspx>)

These risks are also cited by the EIA a list of potential environmental concerns related to hydraulic fracturing for shale gas since the fracturing of wells requires large amounts of water and produces large amounts of wastewater. Some of these concerns include:

- Significant use of water for shale gas production may affect the availability of water for other uses and can affect aquatic habitats.
- Hydraulic fracturing fluid may contain potentially hazardous chemicals. If mismanaged, these materials can be released by spills, leaks, faulty well construction, or other exposure pathways, which may contaminate surrounding areas.
- Wastewater from fracturing may contain dissolved chemicals and other contaminants that could require treatment before disposal or reuse. Wastewater treatment and disposal because of the quantities of water used and the complexities inherent in treating some of the wastewater components, treatment and disposal is an important and challenging issue.
- Hydraulic fracturing causes small earthquakes, but they are almost always too small to be a safety concern (reference the United States Geological Survey). Fracking fluids and formation waters (wastewater) are returned to the surface. The injection of wastewater into the subsurface can cause earthquakes that are large enough to be felt and may cause damage.”

(http://www.eia.gov/energy_in_brief/article/about_shale_gas.cfm)

“If we did all the things we are capable of, we would literally astound ourselves” Thomas Edison

What are the implications for ISA? One of ISA’s strategic goals is to look at Big Data, to use

analytics so that ISA’s products and services are market driven.

For the US, the EIA’s report “Outlook for U.S. shale oil & gas” projects that:

- Shale gas will lead the growth in total gas production through 2040 to reach half of US output
- Natural gas prices will remain well below crude oil prices
- Natural gas consumption growth driven by electric power, industrial, and transportation use
- Manufacturing output and natural gas use will grow with lower natural gas prices
- Rapid growth of natural gas use in the transportation sector, especially in freight trucks
- US becomes a net exporter of natural gas in the near future
- Energy-related CO2 emissions remain below 2005 levels for the forecast period

Read the full report at www.eia.gov.

While I have not researched the implications for each of the 32 countries included in the EIA assessment, ISA might begin by looking at the data to understand how this phenomenal growth in shale gas and tight oil affects the automation industry, not just in the US but around the globe.

Are there opportunities for ISA to provide training, certifications, certificate programs, or standards related to shale gas production, water and wastewater, leak detection and repair, or micro seismic hydrofrack monitoring? Do we have existing products and services that can be applied to shale? Are there opportunities for ISA to develop new standards, products, and services related to shale gas or tight oil? ***What else might ISA do?***

If you are engaged in shale gas and tight oil initiatives and are interested in helping to investigate the shale gas opportunity for ISA, please let Society leadership know. Contact ISA President Peggy Koon at president@isa.org.