

# MANUFACTURING INSIDER

## VOLUME 6 :: ISSUE 3

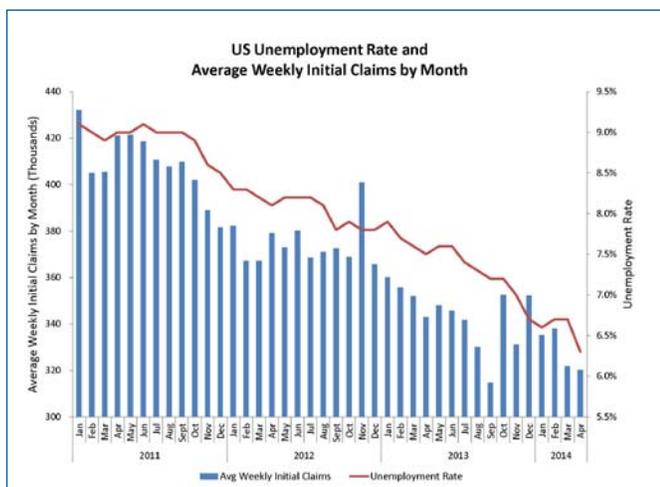
In This Issue:  
 What's Trending?  
 3D Printing Is Changing The World Of Manufacturing



### WHAT'S TRENDING?

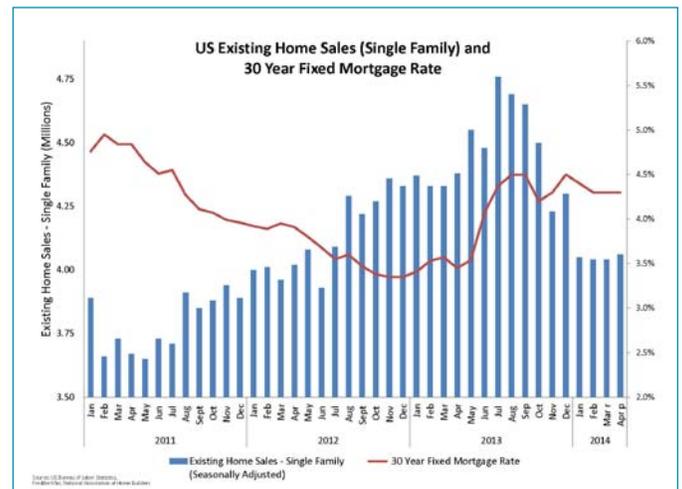
A tough winter caused manufacturing demand to slow in the first quarter of the year. However, the US economy is again gaining steam with most economic indicators remaining positive. Light vehicle sales, non-farm payrolls and housing demand are showing a positive trend in the second quarter, with a continued positive outlook for the second half of the year.

#### Unemployment



Both the initial unemployment claims and unemployment rate (U-3) are trending down from the prior quarter. Despite slow growth since the recession, job creation in the private sector has improved significantly. Many sectors are experiencing shortages of qualified workers. Increased employment corresponds with other improving economic factors.

#### Housing and Mortgage Rates

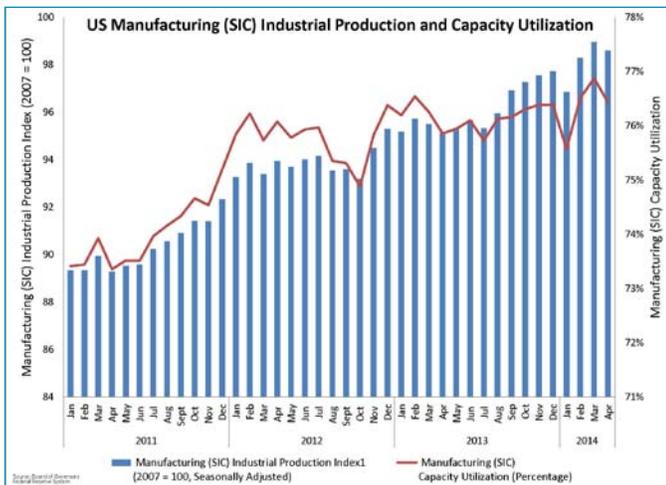


Although new home sales continue to be steady in a majority of markets, existing home sales have leveled off. The traditional Spring buying season was off to a slow start. New housing permits dipped significantly at the end of 2013, yet have caught up to previous levels and continue to increase. Mortgage rates have actually declined over the past quarter, which signifies some weakness in the housing market. Discontinuation of the Federal Reserve's bond purchasing program could contribute to a significant increase in lending interest rates and reduced housing demand.

*Continued on Page 2...*

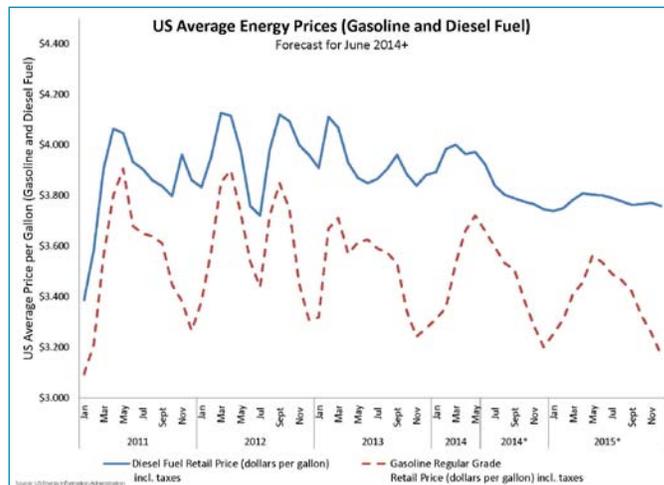
*The next level  
 of service*

### Industrial Production and Capacity



Manufacturing capacity utilization is stabilizing as is the industrial production index (IPI). Some sectors have been experiencing capacity shortages. If demand continues to climb, additional increases in output may require significant capital expenditures.

### Energy Prices



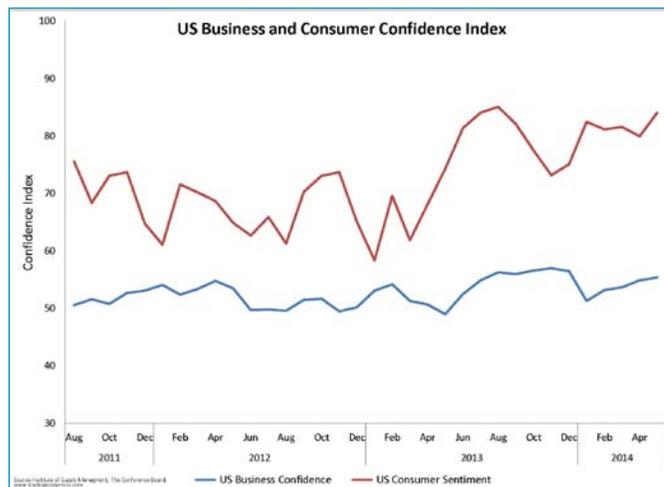
US energy prices have remained stable, contributing to a steady manufacturing environment. Fossil fuel demand has remained steady partially due to increased efficiencies and increase of alternative fuel availability. US production of oil, natural gas and alternative energy sources continued to increase during the quarter. US energy cost continue to be significantly lower than majority of competing countries.

### Purchasing Manager Index



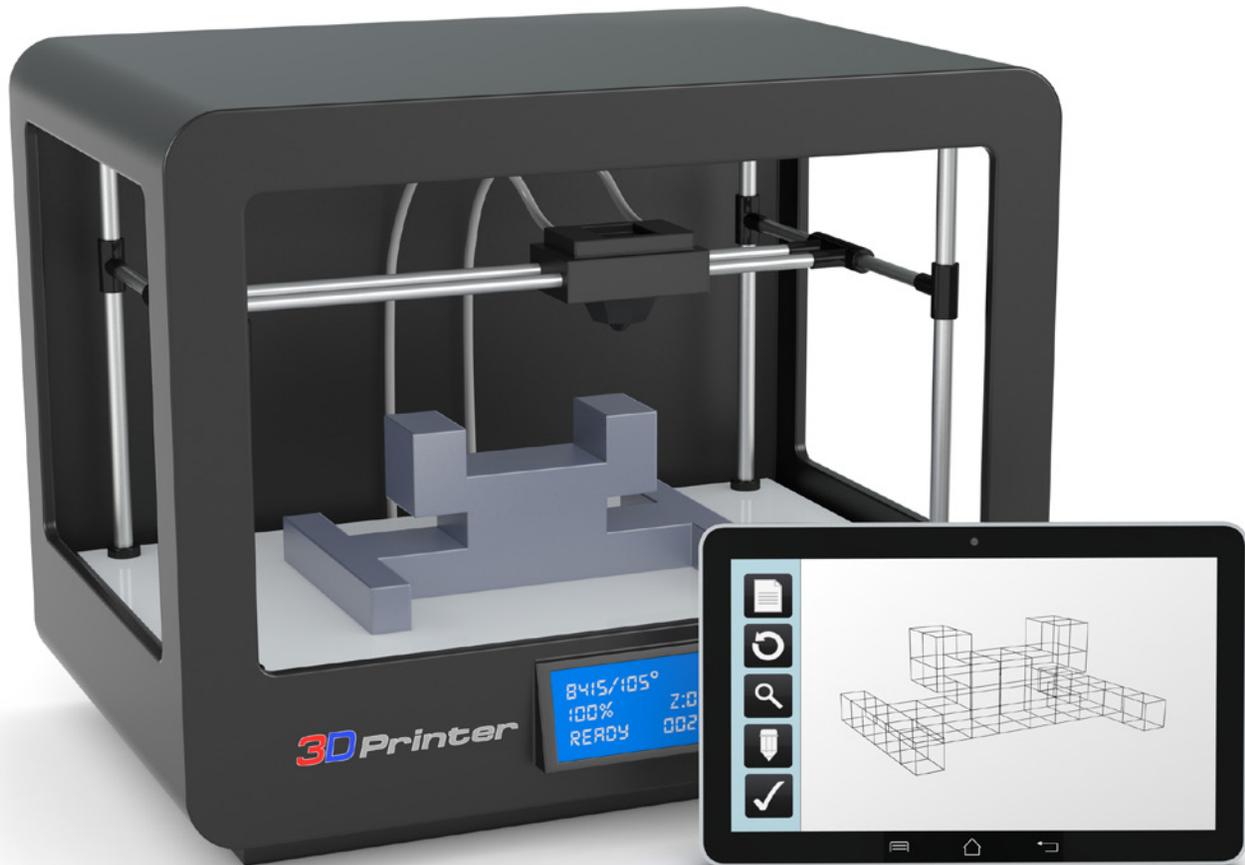
PMI peaked at the end of 2013. There has been significant fluctuation in the index in the past 12 months. First quarter of 2014 showed a significant decline in the index, which was potentially impacted by severe weather conditions. Second quarter of 2014 has shown a significant rebound. Generally, purchasing managers continue to report an increase in demand and corresponding continuation of raw material shortages.

### Business and Consumer Confidence Index



Following a slower first quarter of 2014, the consumer index continues to show a positive trend. The business (and business owner) index has begun to increase during the past quarter as more and more businesses are cautiously optimistic. Businesses continue to express concern over many economic risks and uncertainties (e.g. interest rates, government spending, stock market, natural disasters).

## 3D PRINTING IS CHANGING THE WORLD OF MANUFACTURING



In recent years, 3D printing has taken the world by storm when it comes to prototyping for manufacturing. Its technology has enabled various equipment manufactures to test materials and prototype models at full pledged potential, without the need of spending months on hand building a prototype.

3D printing has come a long way from its roots in the production of simple plastic prototypes. Depending on the type of printing technology and materials used, the applications can vary greatly. Today, 3D printers can not only handle materials ranging from titanium to human cartilage but also produce fully functional components, including complex mechanisms, batteries, transistors and LEDs.

Industries that can benefit, but also be at risk include:

- Rapid prototype manufacturing
- Low volume part manufacturing
- Machine tool makers and builders
- Consumer products

3D printing is perfect for prototyping as it's an economical, fast way of creating one-time usable parts. But in terms of manufacturing, it is still not a cost-saving option as of today. Parts created additively are limited in size. Currently, the most affordable and common 3D printing machines typically are small enough to fit on your desktop, meaning they have built chamber sizes of similar proportions. There are printers that are able to create larger parts, but they are much more expensive and thereby an unrealistic option for many companies.

In time, however, more materials will be added, such as metals and carbon fiber and prices should come down as technology evolves. Over time 3D printers have been able to build larger components and achieve greater precision and finer resolution at higher speeds and lower costs. Together, these advances will bring technology to a tipping point and ready to emerge from its niche status to becoming a viable alternative to the conventional manufacturing processes in an increasing number of applications.

When this happens, technology would transform manufacturing flexibility – for example, by allowing companies to slash development time, eliminate tooling costs, and simplify production runs – while making it possible to create complex shapes and structures that weren't feasible before. Moreover, additive manufacturing would help companies improve the productivity of materials by eliminating the waste that accrues in traditional manufacturing. Overall, the advantages of 3D printing over other manufacturing technologies could lead to profound changes in the way many things are designed, developed, produced and supported.

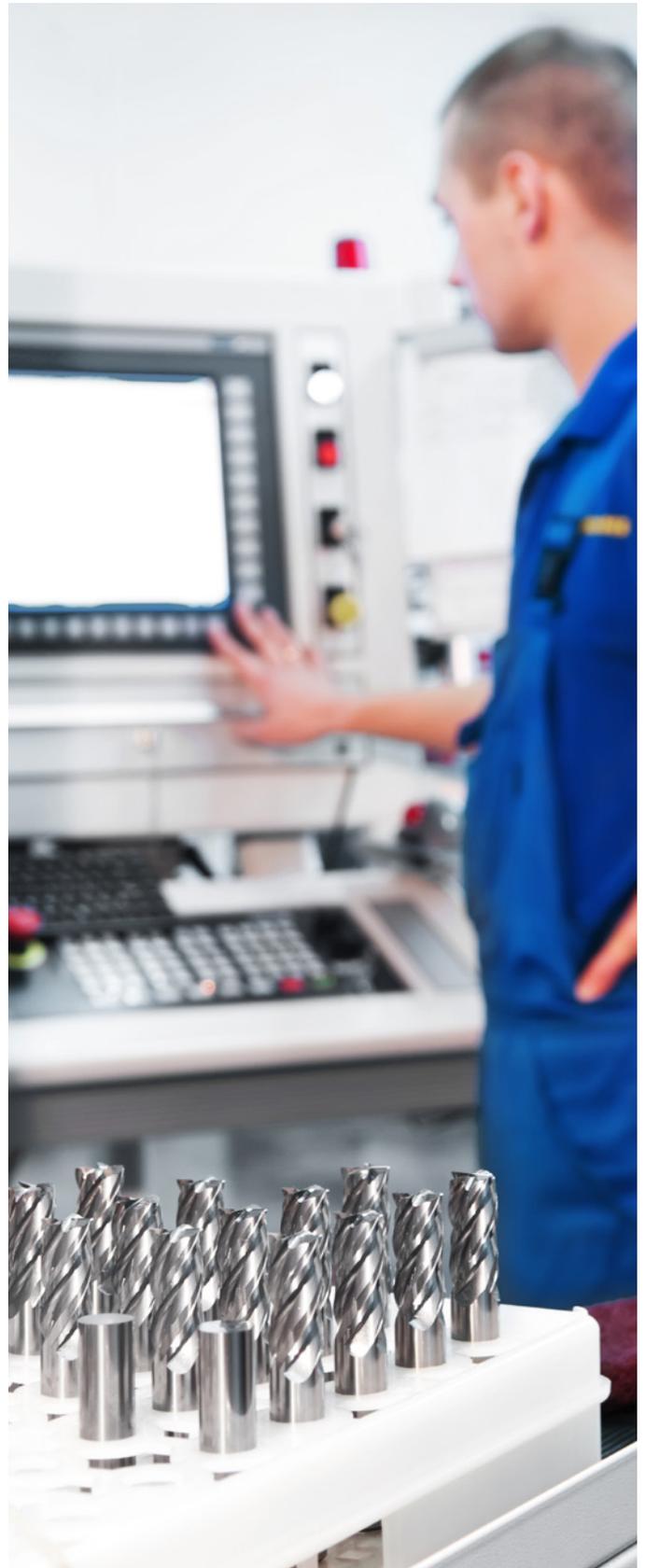
Reducing time in product development was a key benefit of the first 3D printers, which were designed to speed the creation of product prototypes (and in some cases helped reduce turnaround times to a matter of hours, from days or weeks). 3D printing is already being used to get prototypes into the hands of customers faster, for quicker and more detailed feedback. This is happening thanks to advances in printer resolution, higher-definition coloration, and the broader use of materials such as metals, epoxy resins, wax, glass, and a host of other items, helping customers envision the final product. The ability to make prototypes without tooling lets companies quickly test multiple configurations to determine customer preferences, thus reducing product launch risk and time to market. Companies could even go into production using 3D printed parts and start selling products while the traditional production tools and dies are being manufactured or before the decision to produce them had been made.

We expect that the use of such techniques will contribute to significant reductions in product development cycle times over the next decade and over time 3D printing will begin to affect how companies think about R&D in a broader way.

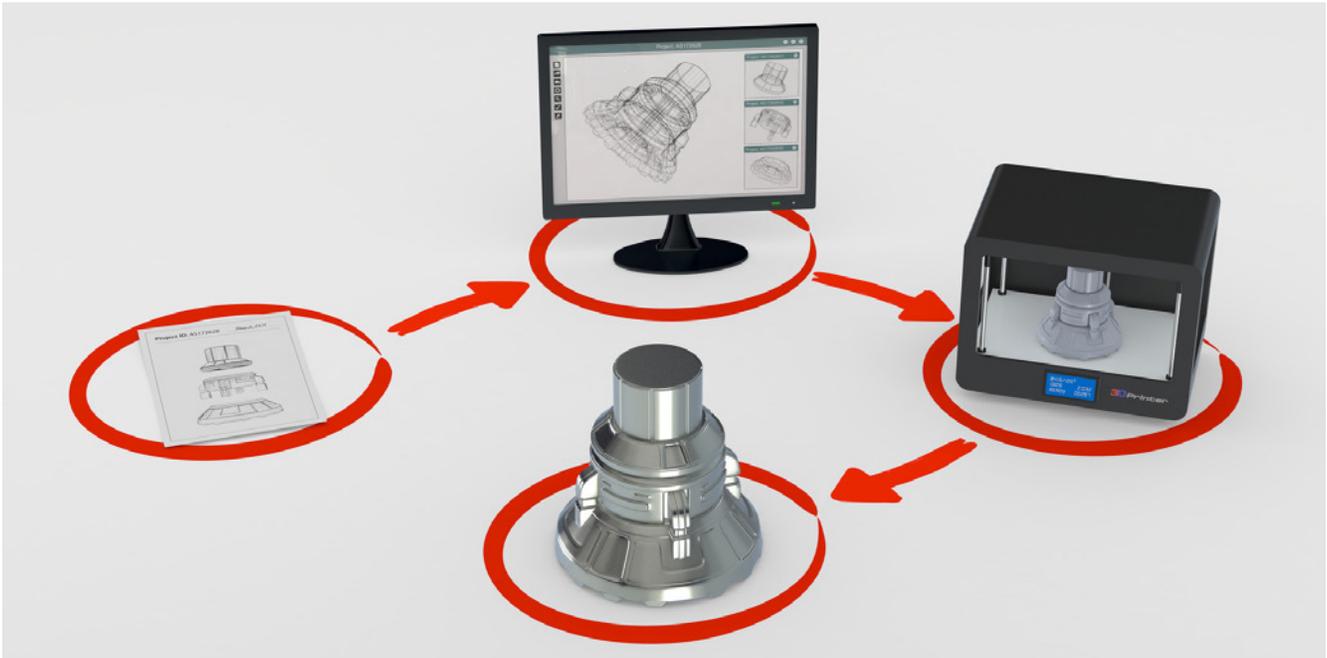
3D printing could also alter the way companies add value to their products and services. The outsourcing of conventional manufacturing helped spur large companies to rely more on their design skills. Likewise 3D printing techniques could reduce the cost and complexity of other kinds of production and force companies to differentiate their products in other ways. These could include everything from making products with fewer welds (and thus longer lived) to creating personalized designs.

Indeed, reducing the reliance on hard tooling (which facilitates the manufacture of thousands of identical items) creates an opportunity to offer customized or made to order designs at lower cost—and to a far broader range of customers. The combination of mass customization and new design possibilities will up the ante for many companies and could prove very disruptive to traditional players in some segments.

Many benefits of 3D printing could cut the cost of market entry for new players, increasing competition: for example, the use of the technology to lower tooling costs makes it cheaper to begin manufacturing, even at low volumes, or to serve niche segments. The direct manufacturing of end products greatly



*Continued on Page 5...*



*Continued from Page 4...*

simplifies and reduces the work of a designer who would only have to take products from the computer screen to commercial viability. New businesses are already popping up to offer highly customized or collaboratively designed products. Others act as platforms for the manufacture and distribution of products designed and sold online by their customers. These businesses are gaining insights into consumer tastes and building relationships that established companies could struggle to match.

Initially, these new competitors will be niche players, operating where consumers are willing to pay a premium for a custom or unique design, complex geometry, or rapid delivery. Over the longer term, however, they could transform industries in unexpected ways, moving the source of competitive advantage away from the ability to manufacture in high volumes at low cost and toward other areas of the value chain, such as design or even the ownership of customer networks. Moreover, the availability of open-source designs for 3D printed firearms shows how such technologies have the potential to create ethical and regulatory dilemmas and to disrupt industries.

If 3D printing is going to become a broadly accepted method of manufacturing consumer-ready products, in what industries would it fit?

The logical answer (based on the current state of technology) would seem to be smaller runs of custom designs where personalization would eventually lead to batch sizes of one. The current generation of consumer 3D printers should be described as just barely past experimental. While it is possible to unbox one of these devices, turn it on, and print a simple object from a downloaded design, the hands-on skills,

patience, and cutting edge attitude required to design and produce high quality results set a very high bar. Even then, the resulting objects are limited to a single material type (generally plastic) and one or very few colors at a time. In other words, these printers are the equivalent to early home computers with command line interfaces, which in perhaps a few short years can develop into the equivalent of an iPad. Many innovations and further cost improvements will be required before home 3D printers can become a mainstream product.

Eventually, as design engineers start to get comfortable with the flexibility that 3D printing provides, they will design products that require components that can only be 3D printed – essentially integrating theoretical design with production engineering in medicine, consumer goods, heavy machinery and everyday objects.

We're not going to see 3D printers replace lathes, mills, welding machines and presses anytime soon, certainly not for volume production. But 3D printing is changing the face of collaborative design and manufacturing process, shrinking lead times, creating previously impossible to manufacture products and leading to mass personalization.

As technology evolves and the material options broaden, they will most definitely be more integrated into traditional manufacturing processes. And, as a new breed of manufacturing and design engineer graduates gain experience with the flexibility and control that 3D printing provides, you can be sure they will be transforming not just design but the very objects we use in our business and personal lives.

By F. Michael Zovistoski, Partner (Albany, NY)  
National Manufacturing Practice

## MANUFACTURING INDUSTRY INSIGHT

UHY LLP recognizes that manufacturing companies require their auditors, tax specialists and business advisors to add value to financial reporting activities. That is why we combine the strength of business and financial expertise with a hands-on, “shop floor” approach to solving complex business decisions in these key segments:

- Aerospace & Defense
- Distribution
- Automotive Suppliers
- Industrial Manufacturing
- Consumer Products

Our professionals are leaders in the industry and take the steps necessary to ensure our client’s future success by identifying and addressing new trends, accounting requirements and regulations.

### OUR LOCATIONS

**CT** New Haven 203 401 2101  
**GA** Atlanta 678 602 4470  
**MD** Columbia 410 423 4800  
**MI** Farmington Hills 248 355 1040  
**MI** Sterling Heights 586 254 1040  
**MO** St. Louis 314 615 1301  
**NJ** Oakland 201 644 2767  
**NY** Albany 518 449 3171

**NY** New York 212 381 4800  
**NY** Rye Brook 914 697 4966  
**TX** Dallas 214 243 2900  
**TX** Houston 713 561 6500

### ADDITIONAL UHY ADVISORS LOCATIONS

**IL** Chicago 312 578 9600  
**DC** Washington 202 609 6100

Our firm provides the information in this newsletter as tax information and general business or economic information or analysis for educational purposes, and none of the information contained herein is intended to serve as a solicitation of any service or product. This information does not constitute the provision of legal advice, tax advice, accounting services, investment advice, or professional consulting of any kind. The information provided herein should not be used as a substitute for consultation with professional tax, accounting, legal, or other competent advisors. Before making any decision or taking any action, you should consult a professional advisor who has been provided with all pertinent facts relevant to your particular situation. Tax articles in this newsletter are not intended to be used, and cannot be used by any taxpayer, for the purpose of avoiding accuracy-related penalties that may be imposed on the taxpayer. The information is provided “as is,” with no assurance or guarantee of completeness, accuracy, or timeliness of the information, and without warranty of any kind, express or implied, including but not limited to warranties of performance, merchantability, and fitness for a particular purpose.

UHY LLP is a licensed independent CPA firm that performs attest services in an alternative practice structure with UHY Advisors, Inc. and its subsidiary entities. UHY Advisors, Inc. provides tax and business consulting services through wholly owned subsidiary entities that operate under the name of “UHY Advisors.” UHY Advisors, Inc. and its subsidiary entities are not licensed CPA firms. UHY LLP and UHY Advisors, Inc. are U.S. members of Urbach Hacker Young International Limited, a UK company, and form part of the international UHY network of legally independent accounting and consulting firms. “UHY” is the brand name for the UHY international network. Any services described herein are provided by UHY LLP and/or UHY Advisors (as the case may be) and not by UHY or any other member firm of UHY. Neither UHY nor any member of UHY has any liability for services provided by other members.

©2014 UHY LLP. All rights reserved. [0714]