



SKILLED-LABOR SHORTAGE: MYTH OR REALITY?

ABSTRACT

Employing qualified workers is a huge burden on contractors and construction owners. Nowhere is the problem more acute than in the availability of skilled laborers. New equipment and increased productivity has reduced the impact of labor on total project costs; however, this has further increased demand for skilled laborers. Is the labor force prepared to supply this additional skilled labor when contractors already experience shortages of qualified workers — at least in some parts of the world?

Global capital projects have been moving forward strongly over the past few years, placing pressure on workers and materials alike. Demand is fuelling wage increases and higher benefits, significantly increasing total compensation packages. Is the only choice for contractors to pay above-average wages for skilled workers? Does the shortage extend to all parts of the world?

We will present our analysis of key determinants of wage escalation. In the end, estimators will be better prepared to navigate global labor costs and accurately align costs with budgets.

INTRODUCTION

Over the past few years, procuring skilled workers has become more difficult and expensive. Not being able to fill skilled labor positions can lead to cost overruns and project delays. To identify and prepare for high-cost labor it is important to understand the underlying dynamics that drive labor costs. This paper examines the primary factors fuelling wage growth and highlights regions with the potential labor shortages. Equipped with an understanding of key determinants of availability and price, cost estimators will be able to identify high-demand and therefore high-wage areas associated with skilled-labor shortages.

This paper provides a framework for cost estimators to identify labor shortages before they translate into higher wages. The following paper first analyzes current skilled labor market conditions facing contractors. We will then provide a brief theoretical overview of major wage-rate drivers, before deconstructing demand and supply. We will then demonstrate best practices of applying the resulting framework to two case studies, oil sands development in Canada, and skilled construction labor in the United States. Upon completion of this paper, cost estimators will be equipped with analysis and insight to identify and prepare for skilled-labor shortages.



WHERE ARE WE NOW?

- Developing unconventional oil and gas resources is fueling labor demand, but is more labor-intensive than conventional extraction methods.¹
- Shortages are emerging and sourcing skilled labor has been identified as a top-5 barrier to growth for the past few years.²
- Compensation costs in the oil and gas sector have seen double-digit annual increases in some regions.

Skilled laborers, such as welders, electricians, boilermakers, and pipefitters, are increasingly difficult to source. Contractors in high-investment industries such as nonresidential construction and oil and gas are being caught off guard by the two-fold problem of labor availability and price. Before the mid-1990s, skilled labor markets were roughly balanced, with industry demand for workers keeping pace with labor supply. This created a stable environment for skilled-wage escalation. Cost engineers could count on readily available skilled workers, with wages increasing in the 3% per year range. However, for the last decade, skilled labor markets are no longer balanced, and cost estimators must be aware of what factors will move prices over both the near and long term.

Global capital investment expenditures (CAPEX) are growing at a rapid pace. Discussed in more detail below, global CAPEX is pushing labor markets out of balance. Due to the specialized nature and large pipeline of projects moving forward, contractors are increasingly finding themselves strapped for labor, especially among skilled professions, resulting in delays and higher costs. Labor shortages are further exacerbated by the remote locations and large labor requirements of the projects moving forward. With labor accounting for roughly 30% of costs, projects can quickly overrun their budgets and fall behind schedule. Skills shortages have been identified by the oil and gas industry as a significant barrier to growth over the last few years, and wages are on the rise. Understanding the fundamental drivers of wage growth allows cost estimators to identify and budget for higher wages associated with potential skills shortages.

HOW DID WE GET HERE?

- There are three main factors that move wages: inflation, demand for labor, and supply.
- All of these factors are pointing to higher wages over the near term.

Intuitively, the two main areas of concern for cost estimators are availability and price. However, in order to understand what influences these factors, estimators must understand the underlying supply and demand fundamentals that affect both supply and price. The following sections will provide a detailed analysis of supply and demand fundamentals; however, we will begin our discussion with a basic model describing wage escalation rates. The model we will use to describe wage-escalation among skilled workers examines changes in cost of living and the interaction between supply and demand dynamics. More formally:

$$\Delta W_i = f\{\Delta C, \Delta(D_L - S_L)\}$$

equation 1

Where:

ΔW_i is a measure of the change in wages for a worker at firm i .

ΔC is a measure of the change in the cost of living, or inflation. As a general rule, inflation sets the floor for wage increases as a worker's wage must keep pace with the rate at which prices are increasing for the worker to realize the same utility from their wages.

$\Delta(D_L - S_L)$ is a market balance term that measures the interaction between supply and demand. If supply is large and demand is weak, we expect bargaining power to reside with the employer, thus weighing on wage escalation. If supply is tight and demand is strong, bargaining power will rest with the employee, thus having a positive impact on wage escalation.

Cost of Living

Adjustments for the cost of living set the floor for wage escalation. A measure of consumer price inflation is generally used to determine price movements over a period of time. Cost of living increases ensure that an employee's wage is keeping pace with the rate at which the goods s/he consumes is increasing. Without adjusting for the cost of living, an employee may experience a reduction in the utility from their wages. Any wage increase in excess of the cost of living increase is referred to as a real wage increase, indicating an increase in utility in excess of what was previously received.

1. Larson, J. W. "Unconventional Plays Fueling Economic Growth." American Oil and Gas Reporter. <http://www.aogr.com/> (accessed Jan. 20, 2013).

2. "Seismic Shifts — The outlook for the oil and gas industry in 2013." GL Noble Denton. <http://www.gl-nobledenton.com/en/seismic-shifts.php> (accessed Jan. 15, 2013).

While wage increases due to rising costs of living do not contribute to real wage growth, it is important to understand how inflation rates influence wage escalation. This allows contractors to separate wage increases attributed from cost of living adjustments from wage increases driven by supply and demand fundamentals. For example, in areas experiencing hyperinflation such as Venezuela, a nominal wage increase of 25% may at first glance appear shocking, and a contractor may assume that laborers are scarce and expensive. However, with inflation running in the double-digit range, the real wage increase attributed to market fundamentals is significantly reduced signaling that market fundamentals may actually be more balanced.

Supply and Demand Balance

The most important driver of wage movements is the interaction between demand and the available supply of workers. The importance of this dynamic is two-fold and has a direct impact on project costs. The first cost impact that arises from supply/demand imbalances is project delays. The inability to source labor ultimately means that projects are delayed as there are no workers with the requisite skill sets to complete each project. As shortages arise, firms must compete with each other over scarce labor resources, leading to the second impact that arises from supply/demand imbalances: cost. Firms compete for labor resources by offering to pay more through higher wages and expensive benefit packages. This competition increases the base compensation package across occupations, leading to higher cost for the entire industry. We therefore can expect strong compensation costs increases to accompany times when there is a market imbalance between strong demand and limited supply.

The question remains: how can estimators predict labor market imbalances that could spur strong labor cost increases? The remainder of this paper will focus on the factors which contribute to shifts in supply and demand. A deeper understanding of fundamental drivers of supply and demand dynamics will provide a framework for cost estimators to assess current and future projects, allowing them to identify areas vulnerable to labor shortages, and thus prepare for potential labor-driven cost increases. The following sections will focus first on primary drivers and determinants of demand, then move on to an analysis of labor supply response.

WHAT DRIVES DEMAND

Demand for skilled workers is a function of the number of projects moving forward (measured by industry capital expenditures), the base labor requirement for each type of project, and changes in productivity.

$$\Delta DL = f(\Delta CAPEX, \Sigma(I_1 + I_2 + \dots + I_n), \Delta P) \quad \text{Equation 2}$$

Where:

ΔD_L is the change in demand for labor over time.

$\Delta CAPEX$ is the change in capital expenditures by firms in an industry. Higher CAPEX outflows signify higher project spending, thus more demand for labor.

$\Sigma(I_1 + I_2 + \dots + I_n)$ is the base labor requirement for a type of project i through n .

ΔP is the change in productivity per worker, or output per worker. As productivity increases, fewer workers are required to produce one unit of output.

CAPEX

The broadest determinant of demand is capital expenditures. In general, CAPEX flows are determined by business cycles and demographic trends. However, recently CAPEX flows have been influenced by high commodity prices and strong global demand. Strong growth in emerging markets has increased global demand for key resources, pushing prices up. Higher prices increased existing project profitability and made high-cost projects feasible. Following the global recovery, firms found themselves flush with cash, and capital is now flowing around the world to unlock resources, pushing labor demand up. Unfortunately these flows are not evenly distributed, as illustrated in **Figure 1**.

Figure 1. Oil/Gas CAPEX Spending by Region

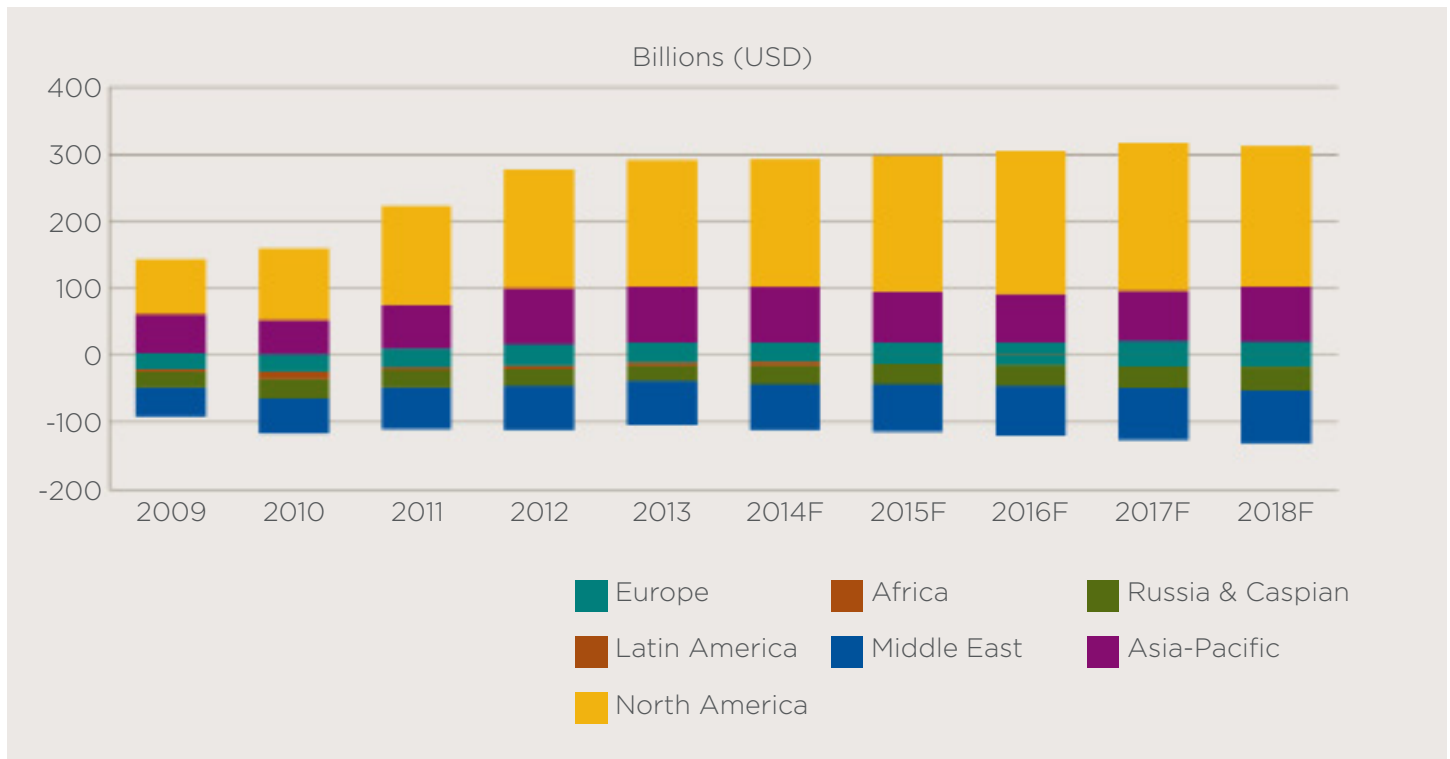


Table 1 demonstrates the regions that are experiencing the strongest growth in CAPEX in the upstream oil and gas sector, and consequently some of the strongest demand for skilled workers.

The above graph and table demonstrate two key considerations when measuring future demand for labor. The first aspect to consider when looking at global CAPEX is which areas are experiencing the highest amount of CAPEX spending on a level basis. The clear winners in **Figure 1** are North America and the Asia-Pacific regions. In 2007 North America and Asia Pacific accounted for 58% of global CAPEX spending, and this share increased to more than 62% by 2012. As shown in **Table 1**, this growth is expected to slow, but will remain at high levels, creating large demand-pull on labor markets and possible pre-existing labor shortages.

The second aspect of global CAPEX flows to consider is the rate at which CAPEX is increasing in a given country or region. Looking at Table 1 we can see that the growth rate of CAPEX in Africa over the next five years explodes and has the highest growth globally while average spending growth in the Middle East almost doubles. These regions will most likely experience stronger labor demand growth over the next five years.

Table 1. Oil/Gas CAPEX Growth by Region

	2009–2013	2014–2018
Africa	-0.8%	6.8%
Asia-Pacific	7.0%	3.7%
Europe	7.1%	3.6%
Middle East	2.7%	4.1%
North America	8.6%	4.0%
Russia & Caspian	5.4%	3.3%
Latin America	6.3%	4.0%
Total	6.4%	4.0%

Source: "Global Upstream Oil and Gas Industry Spending." IHS Upstream Spending Report 3Q2012 (2012)

Labor Requirements

The current CAPEX cycle is based around extracting and processing natural resources. Unfortunately, many of the areas holding these resources are in remote locations, or the resources are incredibly difficult to access, leading to higher base labor

requirements. Projects located in remote locations suffer from a small local labor pool, and must fly-in labor, oftentimes investing in expanding communities, and subsidizing housing and recreational activities for employees. Projects that have followed this approach include major mining projects in Western Australia (Asia-Pacific region) and oil sands projects in Alberta, Canada (North America). Many projects in emerging countries including Brazil and Nigeria must contend with local content regulations that also push up the labor requirements per project as many local labor markets are ill-equipped to meet skilled labor demand. Employers must therefore establish training programs to meet requirements.

However, working in remote locations or emerging economies are not the only issues facing contractors. Many of the new processes implemented to extract oil and gas from unconventional sources are more labor-intensive than previous processes. An example of new processes is the technology used to extract oil and gas from shale reserves in the United States (North America). Unlike conventional oil wells where capital investment was front-loaded, meaning that after the well was constructed the labor requirements for operation were minimal, the process of fracking is labor intensive throughout the project life cycle.³ Each well is less productive than a traditional well, meaning more wells must be drilled, and wells must be fracked, and re-fracked to keep them producing. These dynamics mean that more workers are required per project for a longer period of time, further inflating demand.

Productivity

With both demand from investment spending and base labor requirements per project increasing, it calls into question what factors will help curb demand. The third and final component of labor demand that can dampen demand-pull on the labor market is labor productivity. Labor productivity is a measure of output per worker. Several factors affect productivity, which influences the impact of investment demand on labor markets. Our discussion focuses on the two primary drivers of productivity increases: experience, and technology.

One of the natural drivers of productivity growth is experience. It is especially true among skilled professions that there is a learning curve associated with an employee's work. As a worker gains more experience in the work force, they also become more efficient and generate more output per hour worked. The largest productivity increases are concentrated at the beginning of a worker's career, meaning productivity growth will be strongest

among inexperienced workers and will slow as workers gain experience.⁴ The second driver of productivity is technology. Technology is often adapted to improve workflow and increase productivity among inexperienced and experienced workers alike. However, productivity increases often lag technology implementation as employees will require training and time to incorporate technologies into their work process. The nature of productivity gains from both worker experience and technology implementation indicates that productivity is highest in mature industries, but is growing fastest in new industries. This is an important dynamic to consider when determining the cost implications of productivity growth on a given project.

What Does This Mean for Demand?

With the above demand parameters in mind, consider the situation facing labor markets now.

We are seeing continued demand pull in CAPEX, however CAPEX spending varies across regions. The projects moving forward to unlock resources are increasingly more labor-intensive, meaning the base labor requirement term is also increasing rapidly. Meanwhile, firms are implementing new technology to maximize output but the technology is new and few workers have training or experience working with the new technology. The demand-side of our global market balance term is increasing, but is increasing at different speeds, depending on geography. This means some regions may be reaching a crisis point in the near term, while other regions may be facing that point further down the road. Productivity patterns indicate that there will be some productivity give-back as both skilled laborers and technologies mature, however this may take years to materialize. To gauge the full impact of demand on wages, we must consider the labor supply side of the equation.

SUPPLY SIDE REACTION

Labor supply is a reactive term. As wages increase, workers begin to enter the market, shifting labor supply out to meet market demand. Unfortunately, adjustments in labor supply generally lag demand, creating temporary periods of shortages. To understand current and future movements in labor supply we must consider the number of workers actively seeking employment, the opportunity costs for an employee to enter the skilled labor force, and the availability of education or training programs. This relationship is described next:

1. Larson, J.W., Fullenbaum, R., and Slucher, R. "Volume 1: National Economic Contributions," In America's New Energy Future. Englewood, Colo: IHS, 2012. 1-35.

2. Aubert, P., and Crepon, B. "Are Older Workers Less Productive?" *Economie et Statistique* 363 (2003): 95-119. <http://www.crest.fr/> (accessed Jan. 15, 2013).

$$\Delta S_L = f(\Delta U, \Delta ROI)$$

Equation 3

Where:

ΔS_L is the change in labor supply.

ΔU measures changes in the unemployment rate, or the change in percentage of the number of individuals searching for jobs.

ΔROI measures the return on investment associated with entering or remaining in the workforce. As wages rise, the return associated with entering the labor force also increases, meaning individuals are more likely to enter or remain in the work force.

Unemployment

The unemployment rate is determined by calculating the percentage of the labor force that is not currently employed and is actively seeking employment. Unemployment is an indicator of labor-availability with high unemployment signaling a slack labor force, and low unemployment signaling tightness. However, unemployment rates vary by region, industry, and occupation. A high national unemployment rate may mask labor tightness in specific industries or geographic regions. We must therefore consider the remaining determinants of labor supply.

Workers' Return On Investment: Training, Immigration, and Retirement

Entering the skilled workforce is an investment in a worker's future, and the return associated with being a skilled worker will influence the number of workers entering and leaving the labor force, including the decision to start a long training program, to move to a country with high worker demand and to retire from the workforce. **Table 2** illustrates the average hours of training required to be a journeyman by occupation. It can take anywhere from three to five years before a worker is able to work independently at their job, meaning three to five years of paid salaries which may not be worth the investment. However, as labor markets tighten and wages rise, the future potential income of skilled workers also increases, making an investment in training and education more attractive. Over time, higher wages will induce more workers to train for skilled positions, resulting in an inflow of workers to the labor market. Unfortunately it takes time for wages to rise and often shortages will have already arisen before workers decide to enter the workforce. There are some short-term mechanisms for labor supply increases associated with high potential wages. High wages may induce immigration if wages in one country are significantly higher than elsewhere. Similarly, high wages may keep aging workers in the workforce longer as the benefits of one more year of working may outweigh the benefit of entering retirement. Immigration and delayed retirement have the potential to provide a temporary boost in the labor supply.

Table 2. Average Duration of Apprenticeships

OCCUPATION	DURATION OF APPRENTICESHIP	CLASSROOM HOURS/YEARS	OTJ TRAINING HOURS PER YEAR	TOTAL HOURS OF TRAINING
Cement Mason and Finisher (Journeyman)	3 Years	144	2,000	6,432 Hrs
Carpenter (Journeyman)	3-4 Years	144	2,000	6,432-8,576 Hrs
Structural Iron & Steel Worker (Journeyman)	3-4 Years	144	2,000	6,432-8,576 Hrs
Construction Equipment Operator (Journeyman)	3-4 Years	144	2,000	6,432-8,576 Hrs
Electrician (Journeyman)	4 Years	144	2,000	8,576 Hrs
Welderfitter (Journeyman)	4 Years	144	2,000	8,576 Hrs
Plumber, Pipefitter or Steamfitter (Journeyman)	4-5 Years	246	1,700-2,000	7,784-11,230 Hrs

Source: "Occupational Outlook Handbook." U.S. Bureau of Labor Statistics. <http://www.bls.gov/ooh> (accessed Feb. 15, 2013)

What Does This Mean for Supply?

Considering the dialectic reaction of supply to demand, labor supply will move to balance labor shortages over time. However due to the lagged nature of supply response, especially among skilled workers, the adjustment on the supply side will not be perfectly coordinated with demand. We therefore can expect labor shortages to persist over the near term as workers adjust their behavior to enter the skilled labor market. However, as skilled workers continue to enter the labor market and productivity increases, the demand impact of strong CAPEX and base labor requirements will be reduced. This has the potential to lead to a temporary period of over-supply in the future, cutting down on cost burdens.

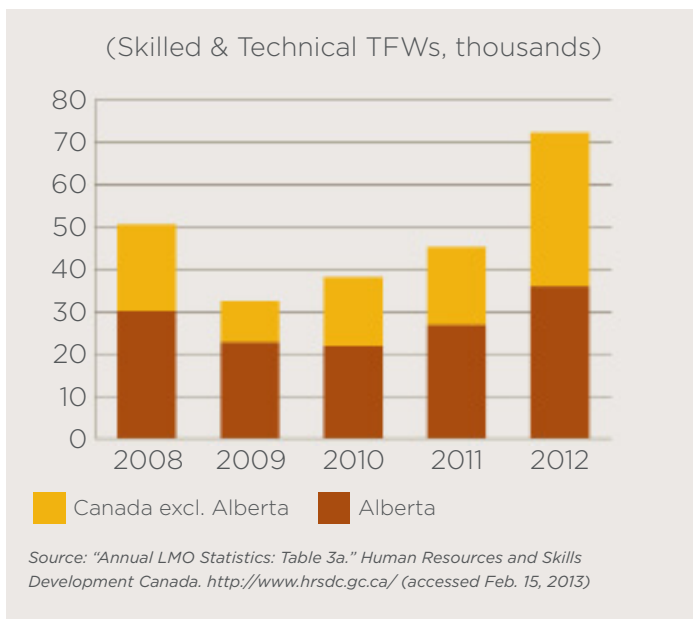
CANADA AND THE UNITED STATES: HOW ARE THESE HOTSPOTS DEALING WITH LABOR SHORTAGE?

The following case studies apply the supply and demand concepts already discussed to current labor market conditions. The first discussion focuses on wage escalation trends in areas already experiencing shortages by examining the supply response of labor markets in Canada. The paper will then move on to identifying areas of potential shortages, and discuss planning ahead to reduce the cost-impact of labor shortages.

Estimating Wage Escalation Trends in Areas of Current Shortages: Alberta, Canada

Some regions are already experiencing skilled-labor shortages, overheating wages. CAPEX in Alberta, Canada has increased an average of 8.2% per year over the past 10 years on the back of

Figure 2. Skilled Immigration



strong oil sands development. Sustained crude oil prices above \$70 per barrel make mining oil sands profitable, resulting in an investment boom. Unfortunately the oil sands are remote, and refining oil sands is a labor-intensive process requiring workers to not only build processing facilities, but also develop infrastructure and continually operate machinery, leading to high base labor requirements per project. Processing oil sands is a new industry and implements new technology, meaning a small pool of experienced workers and low, but increasing, productivity. These strong demand-side factors outpaced the ability of the local market to provide labor, contributing to strong average wage growth (more than 5% annually) among skilled construction workers and oil and gas workers over the past five years, but employers should expect some relief in the near future.

The supply side of the oil sand picture is beginning to improve. While unemployment in Alberta is at historic lows and is the lowest rate in Canada, a combination of government initiatives and supply side responses are beginning to offset shortages. To address the immediate near-term need for skilled workers, the Canadian government eased immigration policy, and helped bring skilled workers into the country. **Figure 2** shows that immigration of skilled temporary foreign workers (TFWs) is responding, led by immigration into Alberta, which accounts for over 40 percent of total skilled immigration into Canada. **Figure 3** illustrates the skilled-labor response. After declining during the recession, enrollment numbers for qualified trade positions and apprenticeships are picking up. The supply-side shifts the economy is experiencing, combined with the potential productivity gains of current workers, will help slow wage escalation over the next few years.

Figure 3. Apprenticeship Training Completions



Identifying Areas of Future Shortages: The United States

Future worker shortages in the construction industry are now feared by many operators and construction firms in the United States. The labor market for construction workers is slack, with the construction industry facing the highest unemployment rate nationally. However, the construction workforce declined

significantly from 2007 to 2010, providing little opportunity for construction workers. Furthermore, the emphasis on attaining a college education has decreased the number of young skilled-trade workers in the labor force. **Table 3** shows that the average age of skilled construction workers is increasing, meaning more workers will be entering retirement over the next five years, leaving the market ill-equipped to handle a construction recovery.

Table 3. U.S. Skilled Workforce is Aging

	AVERAGE AGE		SHARE OF WORKFORCE OVER 45	
	2000	2013	2000	2013
Welders	38.4	38.4	30%	36%
Pipefitters	38.9	38.9	28%	42%
Electricians	39.2	39.2	31%	44%
Average	38.8	38.8	30%	41%

Source: "Demographics (CPS)." U.S. Bureau of Labor Statistics. <http://www.bls.gov/cps/demographics.htm> (accessed Feb. 15, 2013)

Meanwhile, construction in both the residential and nonresidential sectors is poised to improve over the next few years. Pent-up demand for housing is already beginning to surface, and we expect real spending on residential construction to grow 15 percent annually in 2015 and 2016, while real nonresidential investment in structures will accelerate to over 7 percent per year from 2015 to 2018, enough to tighten labor markets. Hiring and training new workers to meet demand will temporarily lower productivity levels. Growth in residential spending will peak in 2015, and real investment in nonresidential structures will experience peak escalation of almost 11 percent in 2017. Sustained demand from 2015 to 2017 will support average wage increases of 3.6 percent per year among construction workers. Skilled workers will feel the squeeze sooner, and will experience wage growth of 4.4 percent between 2014 and 2018. However, growth will not be balanced across regions, and regional hotspots will occur.

Unconventional oil and natural gas drilling is creating an energy renaissance in the United States, fueling hotspots for strong wage escalation. Developing unconventional energy is driving strong CAPEX spending and resulting in high demand for skilled workers. North Dakota is already a hotspot for skilled laborers due to the development of the Bakken shale, with construction wages growing at double digits in the state. Another area developing quickly is the Gulf Coast. Texas and Louisiana are benefitting from both strong investment in tight-oil and gas production, but also from the downstream petrochemical

industries. Workers in both mining industries and skilled construction workers are experiencing wage gains in the 5 percent range, and will continue to experience wage growth in this range through 2016.

BRINGING TOGETHER SUPPLY AND DEMAND: IS THERE A SKILLED-LABOR SHORTAGE?

The above discussion lays out a framework illustrated in **Table 4** that will allow cost estimators to identify projects that may face labor shortages, and consequently higher costs. As demonstrated above, demand is highly localized and labor markets take time to respond to demand signals. The adjustment of supply and demand by region makes it unlikely that labor markets will face a global skilled-labor shortage over the long run, but regional shortages are present and will continue to surface. By identifying future shortages, estimators can determine which regions will face stronger wage pressures.

Estimates of skilled labor supply are not easy to derive or estimate for many countries, including developed countries such as the UK or Australia. And this is a necessary component to determine regions or countries facing labor shortages. Therefore we developed a skilled-labor shortage indicator based upon many of the factors listed in Table 4. We selected 20 countries from around the world and compiled estimates on employment, unemployment, CAPEX, and education in each of these

countries. Further, we looked at the experience over the past three years for each of these components and compared it to the average to understand if labor market conditions were tight in a particular country. Figure 4 displays the results and reports

that countries on the left-hand side of the figure are expected to have a greater potential for labor shortages than those on the right-hand side.

Table 4. Wage-Escalation Drivers

Concept	Contributing Factors	Influencers	Relationship to Wage Escalation
Cost of Living (C)			
Cost of Living (C)			
	Inflation	Price Movements Over Time	Positive
Supply-Demand Balance (S-D)			
Demand (D)			
	Industry Capital Expenditures (Δ CAPEX)	Commodity Demand, Project Profitability	Positive
	Base Labor Requirements $\Sigma(I_1+I_2+\dots+I_n)$	Specialization of Project, Location, Duration	Positive
	Productivity (Δ P)	Experience, Technology	Neutral/Negative
Supply (S)			
	Unemployment (Δ U)	Strength of Economy, Size of Labor Force	Negative
	Return On Investment (Δ ROI)	Potential Income, Training Costs, Immigration Costs, Worker Preferences	Positive/Neutral

Of the 20 countries chosen, Chile, Peru, and Thailand represent the greatest near-term potential for labor shortage, according to our calculations. Each of these countries has experienced huge CAPEX gains, as well as strong overall economic growth and therefore has placed pressure on the skilled labor force. Further, the share of population with education beyond secondary school

is below average, particularly in Thailand and Peru, setting the stage for a skill mismatch during their strong economic push. Meanwhile Poland has the least potential with an unemployment rate near 10 percent, a highly educated workforce, and a lackluster CAPEX environment over the last thr years.

Figure 4. Countries At Risk for Labor Shortage

SHORTAGE	→			NOT A PROBLEM
Chile, Peru, Thailand	Brazil, China, Colombia, Indonesia, Mexico, Turkey	Canada, Germany, India, Norway, Russia, South Africa, Venezuela	Australia, United Kingdom, United States	Poland

Based upon the last 3-year environment for employment growth, unemployment, CAPEX growth and education

Canada and the United States are not listed as countries to be concerned with, which is contrary to our previous statements identifying these countries as hotspots. That said, the overall labor markets of Canada and the U.S. are not experiencing a labor shortage — only certain parts of these countries, such as Alberta, Canada, and the Gulf Coast region of Texas and Louisiana. If we were to include the estimates for employment, unemployment, CAPEX, and education, these two regions would be reported on the left-side of **Figure 4** in the section with Brazil and Indonesia, or considered a region with greater labor-shortage potential.

Construction firms, owners, and any company employing skilled workers should expect to pay more for these workers for the countries listed on the left-hand side of **Figure 4** — at least over the next few years. In order to understand potential wage pressures facing your organization, a similar exercise should be replicated for each country in your operational or capital plans. Please note that many factors can influence how much you need to pay workers; however, we have found that these factors primarily influence wage growth over time. **Table 5** presents our latest wage outlook for skilled workers for a select number of countries.

Table 5. Skilled-Trade Wage Escalation Rates by Country

	2009	2010	2011	2012	2013	2014F	2015F	2016F	2017F	2018F	2009-2013	2014-2018F
Canada	3.9	2.7	1.2	3.4	4.0	3.5	3.5	3.1	3.4	3.5	3.0	3.4
United States	-0.3	2.4	-1.5	2.4	3.6	4.3	4.6	4.6	4.0	3.2	1.3	4.1
Brazil	7.6	13.5	9.1	11.6	10.6	9.0	8.0	7.5	6.0	5.9	10.5	7.3
Peru	2.1	8.0	4.6	8.9	8.4	7.0	7.0	7.1	7.0	6.4	6.4	6.9
Russia	-0.3	24.1	6.9	11.7	10.2	6.3	7.5	8.1	11.7	9.8	10.5	8.7
Australia	4.7	3.7	5.2	5.0	3.5	3.6	4.0	4.4	4.3	4.0	4.4	4.1
China	13.0	15.0	18.0	8.4	9.2	11.7	10.0	11.4	14.2	13.8	12.7	12.2
Indonesia	4.8	5.4	12.0	14.0	8.4	10.3	8.4	9.4	8.0	7.9	8.9	8.8
South Africa	15.3	22.1	7.7	12.2	6.8	5.0	11.2	14.4	11.4	7.9	12.8	10.0

Source: IHS Global Construction Wage Study

CONCLUSION

Sourcing skilled laborers is becoming more difficult and expensive, but shortages are generally temporary and regional. The above paper provides an analysis of key determinants of wage escalation, namely the supply and demand balance. By understanding key drivers of supply and demand, estimators can identify what is currently influencing labor markets, and glean an understanding of where wages are heading in the future. Armed with the ability to identify shortages, estimators can plan ahead to reduce the impact of higher wages by:

- Recruiting more aggressively in countries with less demand
- Offering higher supplemental pay to cover the temporary shortages and not lock into higher base pay
- Explore off-site construction options, such as prefabrication and modular construction, to reduce the local labor impact
- In regions of longer-term shortages, invest in training and/or establish local training programs to address the skills gaps in the workforce

Ultimately, estimators will be better prepared to navigate global labor costs and accurately align costs with budgets.

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