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## America's Aging Infrastructure

Each day, Americans depend on having a national infrastructure that is efficient, safe and sound. Citizens need good roads to get to work. Businesses need dependable highways, railways, waterways and airports to transport their goods to markets they serve. Businesses and consumers alike rely on infrastructure for power, water and other essential services.

Even though infrastructure plays a vital role in the country's safety, health and overall economy, it is largely neglected by our elected leaders and it needs billions of dollars of investment in the next seven years, according to a recent analysis by the American Society of Civil Engineers.

For an update on America's infrastructure, *OUTLOOK* turned to Andy Herrmann, 2012 president of ASCE, which produces the thorough analysis of the nation's infrastructure every four years. Herrmann has spent 40 years with Hardesty & Hanover, LLP, an infrastructure engineering consulting firm in New York City.

***OUTLOOK: Give us a general picture of the condition of infrastructure in the U.S.***

**Andy Herrmann:** America's infrastructure is in poor condition. It is underfunded, largely ignored, and often at the whim of elected officials. Unfortunately, our representatives are not looking to the future. They're looking short term to their re-election cycle.

Every four years, the American Society of Civil Engineers comes out with a report card that grades the state of our infrastructure. This year, we looked at 16 categories and graded them on a system of A through F. We came up with 11 Ds, four Cs and one B. That's an overall grade of D+. That's actually better than our report card four years ago because some categories started having investments made in them.

But to raise that GPA to a B, we would need to spend \$3.6 trillion by 2020. Since we only see projected funding of \$2 trillion dollars in that time frame we have a funding gap of \$1.6 trillion or about \$200 billion per year between now and 2020. The bulk of the gap is due to surface transportation needs, including roads, bridges, and transit systems, which need an estimated \$846 billion.

**About this article**

Andrew W. Herrmann was the 2012 president of the American Society of Civil Engineers (ASCE). He has spent 40 years with Hardesty & Hanover, LLP, where he has held many positions including structural detailer, structural engineer, project engineer, and associate engineer before becoming managing partner and then a principal. Herrmann's experience includes design, inspection, rehabilitation, and construction along with managing some of the firm's major fixed and movable bridge projects.

Herrmann served on the Advisory Council for three separate Report Cards for America's Infrastructure. Herrmann also has served as a spokesperson for ASCE and appeared in the History Channel documentary "The Crumbling of America."

Herrmann received his bachelor's degree in civil engineering from Valparaiso University and his master's degree from the Polytechnic Institute of New York. Herrmann is a registered professional engineer in 29 states.

**OUTLOOK: Why is there a funding shortage?**

**AH:** Out of sight, out of mind. You never see a water pipe or a sewage pipe because they're underground. People believe they've already paid for that roadway, paid for that bridge, paid for that sewer line. Infrastructure is something you have to keep inspecting and do preventative maintenance on. You have to make sure pipes are sound and they're not closed down and corroded. You have to inspect and maintain roads and bridges.

A lot of states and local governments are stepping up to make investments but we have a problem at the federal level. There are spending cuts, and getting funding is a battle. Congress does not have much courage. They're not willing to look long term. They are looking to get re-elected. You cannot do something for one or two years and expect it to last 50 to 100 years.

**OUTLOOK: So which areas of our infrastructure got the best grades in the latest report?**

**AH:** The best was solid waste. That was the one that actually got a B- because Americans are recycling more than ever before. In 2010, for instance, Americans recycled 85 million tons of 250 million tons of trash generated. That's a 34 percent recycling rate – double what we saw in 1980. That means less trash going into landfills. There are limited places you can pile this stuff.

**OUTLOOK: Which were the worst?**

**AH:** We have a number of sectors with Ds – 11 to exact, including dams, hazardous waste, drinking water, aviation, levees, inland waterways, roads, transit and energy.

Roads got a D but that's up from a D- four years ago. We credit some of that improvement to the stimulus money poured into paving roads during the beginning of President Obama's first term. We had a short-term burst in investment and it showed. The condition of our roadways did improve due to that repaving but it was a one-time investment and didn't address the larger issues.

The federal Highway Trust Fund, which receives money from a federal fuel tax, is expected to be bankrupt by the end of 2014. As fuel efficiency improves, people are paying less gas tax but they're still using the roadways.

We're living on the infrastructure that our grandparents and great grandparents built.

**OUTLOOK: Talk to us about the state of America's bridges.**

**AH:** For bridges, the grade went from C to C+. There was a slight decrease in the number of deficient bridges across the country due to investments made by local governments. In total, one in nine of the nation's bridges are rated as structurally deficient with the average bridge age at 42 years old.

Maintenance and inspection are important for bridges. Proper maintenance can extend the life of a bridge while poor or no maintenance can shorten it.

Inspection is important for public safety. Just look at the Lake Champlain Bridge in upstate New York. This was a bridge they had been watching and it finally deteriorated to the point where it wasn't safe. To protect the public, they closed the bridge even though that created a severe handicap to the community. The nearest detour was eight miles away. Our departments of transportation are trying to do the best they can with the limited funding they receive. They have to balance maintenance, repairs, and replacements of bridges while always keeping the public safety in mind.

**OUTLOOK: What about water systems and sewers?**

**AH:** We gave drinking water a D. It's not for the quality of the water but for the quality of the pipes bringing the water from the source to the users. Some of those pipes are 100 years old. We get about 240,000 waterline breaks in the United States each year, which can shut down roads, flood areas and close businesses and schools. We're living on the infrastructure that our grandparents and great grandparents built. People don't think about it until something happens and they have to boil their water because they have a crack in the pipe and they have contamination.

**U.S. INFRASTRUCTURE REPORT CARD**

Each category was evaluated on the basis of capacity, condition, funding, future need, operation and maintenance, public safety and resilience.

CATEGORY	GRADE
Aviation	D
Bridges	C+
Dams	D
Drinking Water	D
Energy	D+
Hazardous Waste	D
Inland Waterways	D-
Levees	D-
Ports	C
Public Parks and Recreation	C-
Rail	C+
Roads	D
Schools	D
Solid Waste	B-
Transit	D
Wastewater	D

Source: ASCE

## TOP 20 HIGHWAY BOTTLENECKS

The Federal Highway Administration monitors 250 freight-significant highway infrastructure locations across the country and has found these to be the most congested.

LOCATION	RANK	AVERAGE SPEED
Chicago, IL: I-290 at I-90/I-94	1	29
Fort Lee, NJ: I-95 at SR 4	2	29
Houston, TX: I-45 at US 59	3	39
Houston, TX: I-10 at I-45	4	41
Houston, TX: I-10 at US 59	5	41
Gary, IN: I-65 at I-80	6	47
Austin, TX: I-35	7	35
Chicago, IL: I-90 at I-94 (North)	8	35
Atlanta, GA: I-285 at I-85 (North)	9	46
Los Angeles, CA: SR 60 at SR 57	10	46
Minneapolis – St. Paul, MN: I-35W at I-494	11	45
Houston, TX: I-610 at US 290	12	45
Dallas, TX: I-45 at I-30	13	41
Houston, TX: I-45 at I-610 (North)	14	46
Cincinnati, OH: I-71 at I-75	15	47
Denver, CO: I-70 at I-25	16	44
Buffalo – Niagara Falls, NY: I-90 at I-290	17	42
Hartford, CT: I-84 at I-91	18	47
Louisville, KY: I-65 at I-64/I-71	19	45
Atlanta, GA: I-75 at I-285 (North)	20	49

Source: U.S. Dept. of Transportation, Federal Highway Administration, Office of Freight Management and Operations

Wastewater also got a D. We have 700,000 to 800,000 miles of public sewer lines in the United States and most of them were installed right after World War II. Due to overloading, cracks, and breaks, these systems discharge almost 900 billion gallons of untreated sewage each year into our rivers.

### **OUTLOOK: What's the status of the electrical grid?**

**AH:** From now until 2020, the generation of electricity is adequate but the problem is in the transmission and distribution. We rely on aging electric grid and pipeline distribution systems – some of which were built in the 1880s. We've seen more investment in power transmission lines since 2001, but ongoing permitting issues, weather events and limited maintenance have led to a number of failures and power interruptions. Demand will grow beyond 2020 as the population increases. We gave energy a D+.

### **OUTLOOK: Talk to us about America's airports.**

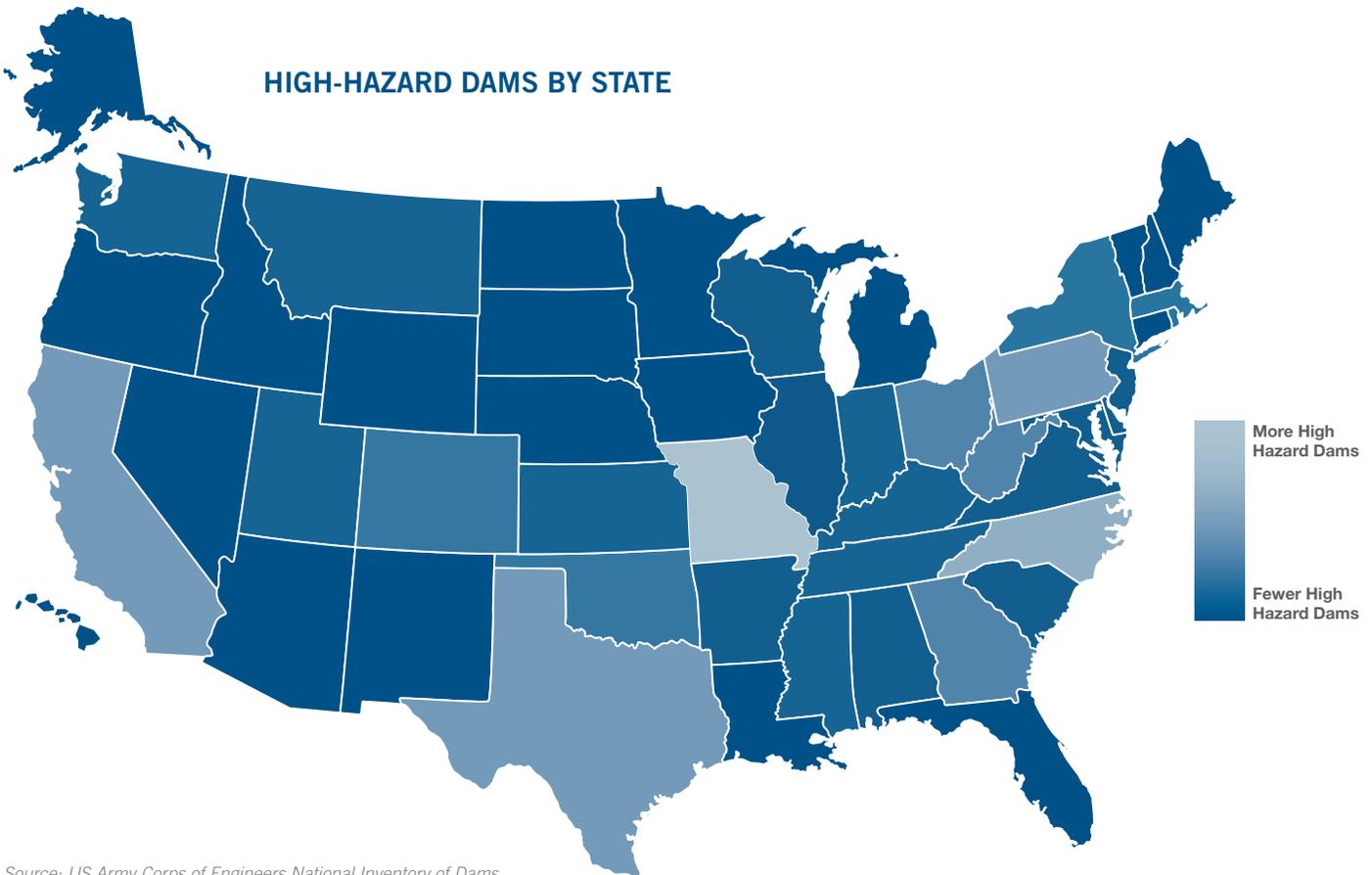
**AH:** Airport congestion is growing. Despite the recession, we saw 33 million more commercial flights in 2011 than we did in 2000. That's really stretched the nation's aviation system. The Federal Aviation Administration estimates that the national cost of airport congestion and delays was almost \$22 billion in 2012. If we continue the same funding levels, the FAA expects the costs of congestion and delays will hit \$34 billion by 2020. We gave aviation a D.

**OUTLOOK: What about our waterways and ports?**

**AH:** Our inland waterways and rivers are the hidden backbone of our nation’s freight transport system. They carry the equivalent of 51 million truck trips each year freeing up congestion on our roads and bridges. Our inland waterways require dredging to their authorized depths and repair, maintenance, and in some cases replacement of the locks that regulate the waterways. More than half of our locks are more than 50 years old. Barges stop for hours each day, prompting unscheduled delays and preventing goods from getting to market. There are about 52 service interruptions a day through the system.

The federal government collects diesel tax in a trust fund to pay for dredging of our waterways, or removing the sediment build-up to ensure waterways are deep enough for cargo ships to operate. But that money isn’t being spent. Whether it’s being used to balance the Congressional budget or what, I’m not quite sure why. Now, as the Panama Canal expands to allow larger cargo ships to pass, there’s concern that they won’t be able to access our U.S. ports and waterways. We gave inland waterways a D- and ports a C.

**HIGH-HAZARD DAMS BY STATE**



Source: US Army Corps of Engineers National Inventory of Dams

“If our infrastructure continues to deteriorate, by 2020 businesses and households will see costs increase by \$1.2 trillion and \$611 billion, respectively.

**NATIONAL 20-YEAR WATER INVESTMENT NEEDS**

SYSTEM SIZE AND TYPE	NEED
Large community water systems serving 100,000 or more persons	\$116.3 billion
Medium community water systems serving 3,301 to 100,000 persons	\$145.1 billion
Small community water systems serving 3,300 and fewer persons	\$59.4 billion
Nonprofit community water systems	\$4.1 billion
Native American and Alaskan native village water systems	\$2.9 billion
Cost associated with proposed and adopted safe drinking water act rules	\$7 billion
<b>Total needs</b>	<b>\$334.8 billion</b>

Source: ASCE

**OUTLOOK: What are the real economic costs of having unreliable infrastructure systems?**

**AH:** It’s scary. We have done a series of economic studies titled “Failure to Act” and found that under-investing in infrastructure will result in higher costs to businesses and households. For example, inefficient roadways and congested air service will mean longer travel times. It will be more expensive to produce and transport goods. Businesses and homeowners will pay more for electricity and water if those systems fail to keep up with demand. If our infrastructure continues to deteriorate, our research shows that by 2020, businesses and households will see costs increase by \$1.2 trillion and \$611 billion, respectively.

As costs rise, business productivity falls, causing GDP to drop, cutting employment and ultimately reducing personal income. If we keep under-funding infrastructure, we could see export losses of almost \$500 billion and over \$1 trillion in total lost trade. Job losses will also mount: We predict that by 2020, we could see 3.5 million fewer jobs throughout the country if infrastructure does not get the repair and maintenance, and investment it needs.

**OUTLOOK: Let’s talk about solutions beyond just “spend more.” What are key changes you would like to see at the federal level for infrastructure that’s federally funded?**

**AH:** Look at the highway bills. Earlier highway bills provided funding for six years duration. The last highway bill, after many short-term extensions, was bitterly fought for and provided funding for just two years. Infrastructure requires a lot of planning for design and for construction. With such a short window of time, Department of Transportation officials cannot effectively plan because they don’t know if the money will be there to continue investments in the future. We need to start looking at infrastructure for the long term, for future generations, not just in a two-year window.

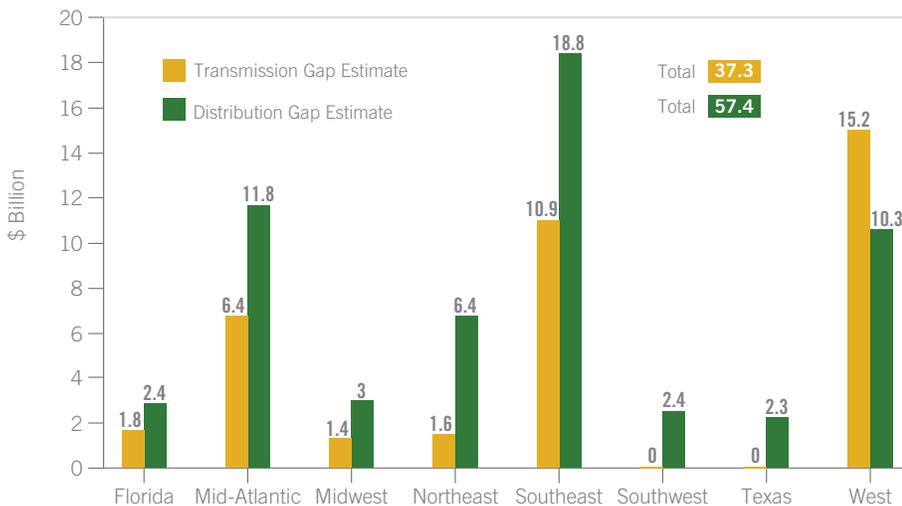
**OUTLOOK: What about state- and locally-funded infrastructure? What changes would you like to see there?**

**AH:** We have seen some strong leadership in the states this year by governors who have been willing to support increased funding for infrastructure. For instance, state of Oregon officials actually tested out a system in which people pay by the mile instead of at the gas pump. So instead of paying on the amount of gasoline their cars burn, they pay on the number of miles they drive. It was an experiment and the money went for roads and bridge maintenance.

**OUTLOOK: What about electric and water infrastructure maintained by utilities? Are they doing a good job?**

**AH:** ASCE's role is to make the public aware of the condition of America's infrastructure, not to judge whether or not utilities are doing a good job. Utilities have old systems – some of them 200 years old – and energy demand is rising. So are power outages. They climbed to 307 in 2011 from 76 in 2007. Utilities face resistance from the public, however, to build the infrastructure needed to meet demand. Water systems too, are old and in need of repair. Clearly there are utilities around the nation that are doing innovative things and investing in their infrastructure. However, others are lagging behind. As a whole, these two sectors have much work to do to get where they need to be.

**ENERGY INVESTMENT GAP BY REGION IN 2020**



Source: ASCE

We have to make sure the American public realizes that infrastructure is not free. We have to pay to maintain it. We have to pay to improve it. Infrastructure affects their jobs, their income – just about every part of their lives.

### U.S. ROADWAYS

- 42 percent of major urban highways are congested, costing \$100 billion annually.
- 32 percent of roads are in poor or mediocre condition, costing \$324 per motorist per year
- \$79 billion investment gap with roads.

Source: ASCE

### WASTEWATER SYSTEMS

- 170,000 drinking water systems across the United States.
- More than 700,000 miles of public sewage pipes in the U.S.
- Water mains and pipes are often over 100 years old.
- ASCE estimates that an investment of \$335 billion is needed for the nation's drinking water systems, as well as \$298 billion for wastewater and storm water systems over the next 20 years.

Source: ASCE

### OUTLOOK: How does the United States compare to the rest of the world?

**AH:** *The Economist* wrote an article on that topic and compared what we invest in our infrastructure to Europe and to China. The U.S. puts 2.4 percent of our GDP toward infrastructure investments each year. Europe invests 4 percent of its GDP and China invests 9 percent of its GDP in their infrastructure. Some people make the argument that China is a developing country and moving fast, but Europe is still spending almost twice what we are on their infrastructure and they are not a developing economy. They realize that they need to invest in infrastructure if they want to be competitive in the world. We are just sitting on past generation's investments and not maintaining for the present or improving them for the future.

We have to make sure that the American public realizes that infrastructure is not free. We have to pay to maintain it. We have to pay to improve it. We have to pay to expand it as our population increases. Infrastructure affects their jobs, their income – just about every part of their lives.

Our "Failure to Act" economic studies have shown that investment in infrastructure pays back more than the investment. Our country needs long-term vision and long-term investment to maintain what we have and prepare for the future. Otherwise we will see ourselves falling behind and our quality of life declining. ■

# Interest Rates and Economic Indicators

The interest rate and economic data on this page were updated as of 8/31/13. They are intended to provide rate or cost indications only and are for notional amounts in excess of \$5 million except for forward fixed rates.

## KEY ECONOMIC INDICATORS

Gross Domestic Product (GDP) measures the change in total output of the U.S. economy. The Consumer Price Index (CPI) is a measure of consumer inflation. The federal funds rate is the rate charged by banks to one another on overnight funds. The target federal funds rate is set by the Federal Reserve as one of the tools of monetary policy. The interest rate on the 10-year U.S. Treasury Note is considered a reflection of the market's view of longer-term macroeconomic performance; the 2-year projection provides a view of more near-term economic performance.

## ECONOMIC AND INTEREST RATE PROJECTIONS

Source: Insight Economics, LLC and Blue Chip Economic Indicators

### US Treasury Securities

2013	GDP	CPI	Funds	2-year	10-year
Q3	2.30%	2.50%	0.09%	0.38%	2.62%
Q4	2.70%	1.90%	0.11%	0.46%	2.78%
2014	GDP	CPI	Funds	2-year	10-year
Q1	2.70%	1.90%	0.14%	0.57%	2.92%
Q2	2.80%	1.90%	0.20%	0.74%	3.06%
Q3	2.90%	2.10%	0.29%	0.89%	3.18%

## PROJECTIONS OF FUTURE INTEREST RATES

The table below reflects current market expectations about interest rates at given points in the future. Implied forward rates are the most commonly used measure of the outlook for interest rates. The forward rates listed are derived from the current interest rate curve using a mathematical formula to project future interest rate levels.

## IMPLIED FORWARD SWAP RATES

Years Forward	3-month LIBOR	1-year Swap	3-year Swap	5-year Swap	7-year Swap	10-year Swap
Today	0.26%	0.35%	1.00%	1.86%	2.49%	3.05%
0.25	0.30%	0.43%	1.19%	2.03%	2.63%	3.16%
0.50	0.37%	0.54%	1.38%	2.22%	2.78%	3.27%
0.75	0.47%	0.68%	1.60%	2.40%	2.93%	3.39%
1.00	0.59%	0.85%	1.83%	2.59%	3.08%	3.51%
1.50	0.92%	1.28%	2.28%	2.95%	3.36%	3.72%
2.00	1.39%	1.84%	2.74%	3.31%	3.61%	3.93%
2.50	1.94%	2.34%	3.11%	3.58%	3.84%	4.09%
3.00	2.50%	2.84%	3.49%	3.86%	4.07%	4.25%
4.00	3.29%	3.59%	3.97%	4.23%	4.37%	4.46%
5.00	3.82%	4.08%	4.33%	4.40%	4.55%	4.60%

## HEDGING THE COST OF FUTURE LOANS

A forward fixed rate is a fixed loan rate on a specified balance that can be drawn on or before a predetermined future date. The table below lists the additional cost incurred today to fix a loan at a future date.

## FORWARD FIXED RATES

### Cost of Forward Funds

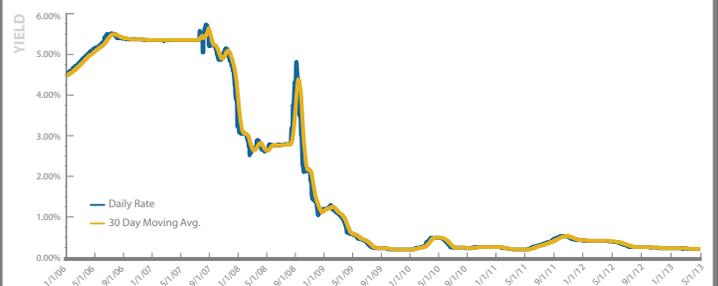
Forward Period (Days)	Average Life of Loan			
	2-yr	3-yr	5-yr	10-yr
30	7	9	9	6
90	18	23	22	15
180	31	42	41	28
365	80	91	85	56

Costs are stated in basis points per year.

## SHORT-TERM INTEREST RATES

This graph depicts the recent history of the cost to fund floating rate loans. Three-month LIBOR is the most commonly used index for short-term financing.

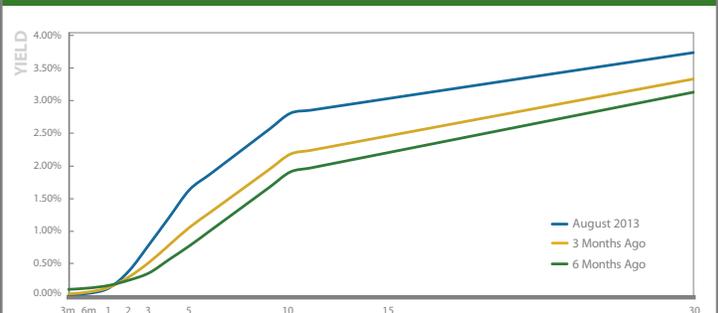
## 3-MONTH LIBOR



## RELATION OF INTEREST RATE TO MATURITY

The yield curve is the relation between the cost of borrowing and the time to maturity of debt for a given borrower in a given currency. Typically, interest rates on long-term securities are higher than rates on short-term securities. Long-term securities generally require a risk premium for inflation uncertainty, for liquidity, and for potential default risk.

## TREASURY YIELD CURVE





**About CoBank**

CoBank is a \$93 billion cooperative bank serving vital industries across rural America. The bank provides loans, leases, export financing and other financial services to agribusinesses and rural power, water and communications providers in all 50 states. The bank also provides wholesale loans and other financial services to affiliated Farm Credit associations serving more than 70,000 farmers, ranchers and other rural borrowers in 23 states around the country.

CoBank is a member of the Farm Credit System, a nationwide network of banks and retail lending associations chartered to support the borrowing needs of U.S. agriculture and the nation’s rural economy. Headquartered outside Denver, Colorado, CoBank serves customers from regional banking centers across the U.S. and also maintains an international representative office in Singapore.

For more information about CoBank, visit the bank’s web site at [www.cobank.com](http://www.cobank.com).

*Commentary in Outlook is for general information only and does not necessarily reflect the opinion of CoBank. The information was obtained from sources that CoBank believes to be reliable but is not intended to provide specific advice.*

## CoBank Announces Board Election Results

Shareholder elections for the CoBank’s 2014 Board of Directors have been completed. A total of six seats for the 2014 board were on the ballot. Overall, the board next year will have 24 elected directors from six regions and at least three appointed directors.

The winning candidates for each open seat are listed in the table below, along with occupation, region, type of seat, residence, and term expiration date. The initial term for one seat in the West region will be for less than the standard four years in order to accommodate term staggering requirements related to the bank’s 2012 merger with U.S. AgBank.

REGION	SEAT TYPE	NAME	OCCUPATION	RESIDENCE	TERM EXPIRES
East	Modified equity	Benjamin J. Freund	Dairy farmer	East Canaan, CT	2017
South	One-member-one-vote	Gary A. Miller	President and CEO, GreyStone Power Corporation	Douglasville, GA	2017
Central	Modified equity	Daniel T. Kelley	Owner/operator of a diversified corn and soybean operation	Normal, IL	2017
Northwest	Modified equity	Kevin G. Riel	President/CEO of diversified farming operation	Yakima, WA	2017
West	Modified equity	John L. “Less” Guthrie	Owner/operator of a cow/calf and stocker cattle ranch and diversified farming operation	Porterville, CA	2016
West	One-member-one-vote	Jon E. Marthedal	Owner of a farm producing grapes, raisins and blueberries	Fresno, CA	2017



Everett Dobrinski

“On behalf of our entire board, I extend thanks to all of this year’s board candidates for their commitment to CoBank and the vital role it plays in the U.S. rural economy,” said Everett Dobrinski, chairman of the board. “Clearly we will continue to benefit from having a board of directors that not only understands the unique needs of the industries we serve but also has the best interests of rural America at heart. Our board will continue working closely with CoBank’s management team to build on past success and position the bank for the future.”

CoBank’s board of directors reflects the bank’s national scope and the diverse industries it serves. Members include agricultural producers, agribusiness executives and representatives from rural infrastructure sectors.

The bank uses an independent Nominating Committee to develop a slate of qualified director candidates for each election. No current board member may serve as a member of the Nominating Committee. No member of management sits on the CoBank board. ■

## CoBank Again Named To “World’s 50 Safest Banks” List

CoBank has been named to *Global Finance* magazine’s list of the world’s safest banks for a third consecutive year.

*Global Finance*, which covers the financial services industry, publishes the “World’s 50 Safest Banks” list annually. Banks are ranked using a methodology that includes total assets and an evaluation of long-term ratings from major rating agencies. CoBank was first named to the list in 2011.



Robert B. Engel

“Financial strength is an important part of the value we offer our customers, who look to CoBank to provide credit and financial services in all market conditions,” said Robert B. Engel, CoBank’s chief executive officer. “We’re very pleased to have once again earned this distinction, which underscores our continued focus on dependability and on managing the bank for the long term.”

The ranking will be published in the October issue of *Global Finance*. Further information is available at the magazine’s web site at [www.gfmag.com](http://www.gfmag.com). ■