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THE TRUMP EFFECT IS A DOUBLE-EDGED SWORD FOR THE ENVIRONMENTAL INDUSTRY

Like it or not we are at beginning of the Trump Era. Just how will the Trump Era be seen in the context of environmental industry history is the question--a question of some significance to today's strategy making decisions in the environmental industry.

A sampling of opinions from industry leaders and from attendees at EBJ's Environmental Industry Summit XV give us at EBJ some latitude to make some early pronouncements. The consensus opinion on the Trump Effect is that it is a double edged sword. One edge is an all-out effort to advance the gross domestic product, make a dent in Rust Belt unemployment, re-shore manufacturing, boost domestic energy production and lay the foundation for a Trump Era ushering in a revolution in infrastructure investment, development and deal-making on a scale to not only make America great again, but also chisel a fifth head on to the face of Mount Rushmore. This edge is mostly good for the environmental industry.

The second edge of the blade is a seemingly ardent lust to cut government and its influence on everyday life and business. This view was crystallized all too clearly in the last of the top three of the administration's central purposes laid out by Trump's lead political architect Stephen Bannon in a February 2017 speech. The first two were not a surprise: "national security and sovereignty" and "economic nationalism" but the third leg of the stool of the "deconstruction of the administrative state" was somewhat more alarming.

"If you look at Cabinet appointees, they were selected for a reason and that is the deconstruction," Bannon told the Conser-

Key Elements for EBJ's Environmental Industry Forecast

Economic Factors	**2015**	**2016**	**2017**	**2018**
GDP: USA	2.4%	1.6%	2.3%	2-2.2%
GDP: Global	2.4%	2.2%	2.6%	2.2-2.5%
Oil Price	-47%	-16%	24%	5%
U.S. Construction (put in place)	10.5%	5.6%	5.3%	6%
Housing Starts	10.8%	5.6%	7.1%	7%
Water/Wastewater Rates	3.3%	3.9%	3.7%	3-5%
EPA Budget	-1.2%	0.2%	-3-5%	-5-10%
EBJ Segments				
Environmental Industry	5.1%	4.0%	3.9%	3-4%
Environmental C&E	2.4%	3.1%	3.4%	3.2-3.8%
Environmental Contracting	0.0%	1.1%	1.9%	1-2%
Environmental Infrastructure	3.5%	3.5%	3.5%	3.3-3.6%

Sources: Economic growth rates are a consensus of reputable sources like IFC, EIU and others; Oil price forecast for 2017 and 2018 based on annual average price estimated by U.S. EIA's industry outlook; Construction a consensus of US Census, FMI and Dodge estimates; Housing Starts from US Census;Water rates from EBJ's index of three water/wastewater rate surveys and EPA budget from EPA Budget in Brief and EBJ estimates; EBJ Segments are estimates derived from multiple sources but predominantly compliations of company revenues and forecasts in each segment; Environmental Contracting includes hazardous waste management and remediation/industrial services; Environmental Infrastructure includes solid waste, water utilities and wastewater treatment works segments.

Inside EBJ

2017-2018 Outlook: The environmental industry braces for—but also embraces the impact of—the double-edge sword of the Trump Effect. Pro-business and anti-regulatory rhetoric has yet to manifest itself in clear policy, but companies are targeting markets where clients are more likely to feel additional freedom to operate; EBJ survey results indicate priority clients and services for growth in 2017-18 1-9

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vative Political Action Conference. "The way the progressive left runs, is if they can't get it passed, they're just gonna put in some sort of regulation in an agency.... That's all gonna be deconstructed." Bannon explained Scott Pruitt as the head of the EPA as an example of appointing officials who question or even disdain what their agencies do.

The goal to dismantle the administrative state or the "fourth branch of government" has been dulled somewhat by the subsequent departure of Steve Bannon from Trump's innermost circle. But the movement has not gone with him, and it's already had some knock-on or trickle-down effect on federal departments and agencies and their morale, and on state and local authorities and their ability to carry out their duties.

In late March, Trump signed an executive order to review the Clean Power Plan (still technically tied up in court challenges that elevated to the Supreme Court), withdraw a moratorium on coal mining on US lands, as well as urging federal agencies to "appropriately suspend, revise, or rescind [regulations] that unduly burden the development of domestic energy resources."

This edge of the sword certainly targets Obama-era new environmental regulations like the Clean Power Plan and the Waters of the United States, but also aims to weaken what is fair to call "permanent feature" standards of environmental protection since the 1970s like NEPA, CAA and CWA, and characterizes environmental issues in general as exaggerated causes of too prominent liberal thinking that gets in the way of doing business.

The demon to this perspective is none other than the Environmental Protection Agency whose fate will be a decent bellwether of the Trump Effect on the more traditional environmental protection and natural resource management segments of the environmental industry. But here early bluster is being countered by evolving pragmatism. While EPA administrator Scott Pruitt was a polarizing choice politically and decidedly unpopular amongst senior staff and career environmental protection professionals, the initial 50% cuts bandied about by administration spokesman and the conservative think tanks like the Competitive Enterprise Institute and others look more in the 2-5% range in May's compromise budget that averted federal government shutdown for at least four months.

As EBJ's lead political analyst Andy Paterson had suggested at EBJ's March 2017 Summit and in subsequent blogs and postings, the Senate and it's customary authority over budgets and federal government spending is acting in the role of 'adult supervision' for the pre-adolescent president and his team in the 'Senate Regency' scenario laid out on page 21. It appears most likely that Congress is taking on this supervisory role and even embracing its relative position of power as the final gateway or stopping point for a number of Trump Administration initiatives, executive orders and trial balloons.

ITS THE ECONOMY, STUPID

In the final analysis of all the factors, the Trump Administration likely will keep its eye on the ball of the gross domestic product and it's quarterly growth, believing the prevailing wisdom that reelection prospects in 2020 will be a function of GDP growth in the next four years. Policies that risk the upward trajectory of these numbers or serve as a distraction from keeping eyes on the GDP ball are unlikely to have too many political bargaining chips wagered on them.

As far as the environmental industry is concerned the leading edge of Trump's double-edged sword will be the factors that affect economic growth, and therefore the pace of construction and development, so while there may be less work per project on a typical development project, there will be more projects to work.

Compromises around budget rollovers and avoiding politically embarrassing government shutdowns are expected to continue to sustain a measure of status quo in the environmental programs overtly targeted during the campaign season.

This 'let sleeping dogs lie' factor likely does not likely apply to the CPP or WOTUS, nor has it or will it to U.S. position on global climate change policy. Global climate policy guru and EBJ Summit panelist David Victor from University of California San Diego however, stated that the USA "taking four years off" in the big picture will not put much of a dent in the 20- or 50-year cycle that global climate policy is on towards rationalizing greenhouse gas emissions mitigation and climate adaptation goals on a global level with economic growth and quality of life.

REVOLUTION IN THE DOMESTIC MARKET

On the domestic front recent quarterly financial reports indicate better earnings than we have seen since 2011, but even the more conservative economic analysts conclude it is more as a factor of economic fundamentals then any change in policy or the administration.

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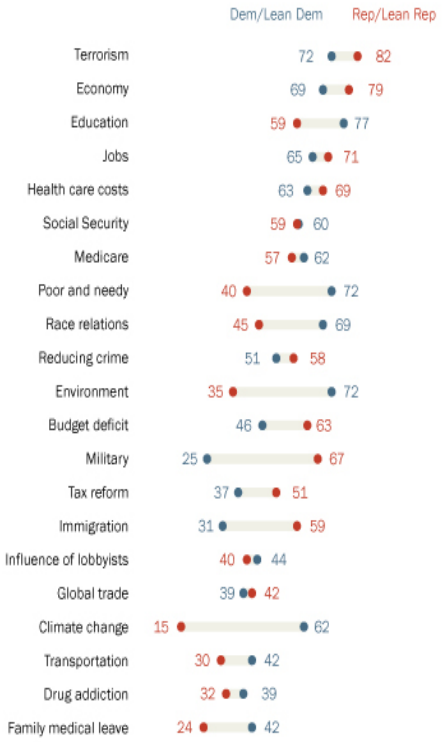
Another piece of the domestic agenda with a significant bearing on the environmental industry is the transition from the concept of 'energy independence' to the potential for 'global energy dominance'. This is in part instigated by what some are observing as a second shale revolution where the collapse of crude oil prices over the previous few years has served to hone efficiencies in horizontal drilling, extracting light crude from shale deposits and getting it to market at a profit with the price even at $50/barrel or lower. American policymakers now seek to wield greater influence over global energy markets and its previously mostly immovable master OPEC, and is presumed to be a key reason why former Exxon chief Rex Tillerson is now Secretary of State.

Another revolution only in its formative stage is in the transportation system with the onset of self-driving vehicles, shared vehicles, grid-controlled traffic and other disruptive forces set to revolutionize personal transportation in urban settings. This revolution has attracted massive investment from Google, Microsoft, Apple, Amazon, Uber, Tesla, BMW, Ford and others. Much less investment has been made in the infrastructure to support the new system, however, or the urban planning, infrastructure and community outreach required for what many inevitably will call the onset of 'socialized transportation'. This is a clear long-term opportunity for the project management community.

Another element for the somewhat more near-term planning horizon is the socio-political drivers portrayed on Pew Research's annual list of top priorities for Americans. The 2017 list shows not only the overall rankings but the split between red and blue America, providing some insight into the political seasons ahead. First, environment does not even rank in the top 10, coming in at 11 of 21 issues (although tied for second for Democrats or those that lean Democrat). Second, while economy is second and jobs is fourth, other Trump Administration priorities immigration, trade

Top Priorities for Americans



Source: PEW Research, January 2017 survey

Impact of the Federal Government on Departments, Agencies or Programs in 2017-2018

	Major Increase	Modest Increase	Marginal Increase	Not Much Change	Marginal Decrease	Modest Decrease	Major Decrease	Elimination
Defense	59%	32%	9%	0%	0%	0%	0%	0%
U.S. Border Patrol	48%	36%	15%	1%	0%	0%	0%	0%
Homeland Security	31%	40%	21%	7%	0%	1%	0%	0%
Domestic CIA & Nat'l Security	8%	37%	26%	17%	6%	4%	3%	0%
Global CIA & National Security	4%	40%	25%	16%	9%	6%	0%	0%
Veterans Affairs	6%	24%	35%	29%	6%	0%	0%	0%
Transportation	5%	27%	37%	15%	13%	5%	0%	0%
Drug Enforcement Agency	5%	13%	48%	27%	5%	1%	1%	0%
Energy	5%	16%	27%	23%	19%	6%	5%	0%
Social Security	0%	1%	6%	61%	15%	9%	8%	1%
Interior	1%	5%	9%	32%	25%	16%	12%	0%
Medicare	0%	3%	6%	40%	26%	11%	13%	1%
Education	0%	2%	7%	32%	26%	26%	5%	1%
Health & Human Services	0%	1%	8%	20%	33%	20%	16%	3%
Housing & Urban Development	0%	1%	9%	20%	30%	21%	15%	5%
Funding for the Arts	0%	0%	0%	10%	8%	30%	33%	0%
Waters of the U.S.	0%	1%	6%	20%	16%	24%	20%	13%
State RE Standard/RPS	0%	1%	5%	12%	23%	23%	25%	10%
Affordable Care Act	3%	1%	4%	6%	16%	21%	21%	29%
EPA	0%	1%	2%	1%	11%	26%	49%	9%
Clean Power Plan	1%	1%	3%	5%	9%	20%	32%	29%

Source: Source: Environmental Business Journal 2017 Market Snapshot & Industry Trend Survey. : Question was: Please rate what you believe the impact of the federal government will be on the budget of the following federal departments, agencies or programs in 2017-2018.

Impact of Trump and Congress on Environmental Markets in 2017-2018

	Major Increase	Modest Increase	Marginal Increase	Not Much Change	Marginal Decrease	Modest Decrease	Major Decrease	Index*
Infrastructure: Oil & Gas Pipelines	43%	35%	19%	2%	1%	0%	0%	3.37
Infrastructure Spending: Roads/Highways	28%	51%	16%	4%	0%	0%	4%	2.88
Infrastructure: Bridges & Tunnels	27%	47%	20%	2%	0%	0%	4%	2.76
Infrastructure: Airports & Spaceports	18%	35%	24%	16%	1%	2%	2%	2.01
Infrastructure: Ports, Lakes & Rivers	9%	37%	32%	17%	5%	0%	2%	1.67
Infrastructure: Power & Transmission	5%	37%	28%	22%	2%	1%	4%	1.40
Infrastructure: Telecom & IT	0%	32%	30%	32%	2%	4%	0%	1.12
Infrastructure: Public Transportation	9%	32%	13%	30%	7%	4%	5%	1.09
Infrastructure: Water/Wastewater	7%	21%	30%	29%	7%	2%	4%	0.96
Infrastructure: Transpo IT: Self-Driving Grid	2%	13%	33%	39%	4%	5%	5%	0.43
Infrastructure: Waste Mgmt/Recycling	0%	9%	29%	35%	16%	7%	5%	(0.07)
Private Redev:Contaminated Sites	2%	15%	10%	31%	23%	12%	7%	(0.31)
Infrastructure Resiliency Requirements	1%	10%	18%	31%	20%	11%	8%	(0.42)
Renewable Energy: Utility Solar	1%	7%	18%	28%	21%	15%	10%	(0.67)
Water Quality Markets	0%	6%	13%	30%	29%	13%	7%	(0.74)
Renewable Energy: Distributed Solar	1%	5%	13%	33%	23%	16%	9%	(0.79)
Renewable Energy: Wind Generation	1%	6%	11%	33%	23%	16%	11%	(0.89)
Federal Remediation: DOE/DOD	0%	6%	16%	28%	22%	17%	11%	(0.94)
Renewable Energy: Wind T&D	1%	4%	12%	37%	16%	20%	11%	(1.00)
Air Quality Markets	0%	2%	17%	27%	26%	18%	10%	(1.05)
RE Other: Geothermal, Wave & Tidal, etc.	1%	1%	15%	32%	20%	21%	11%	(1.12)
Federal Remed: Superfund/RCRA	0%	5%	10%	29%	22%	20%	15%	(1.29)
Natural Resource Protection (NEPA/ESA)	0%	1%	12%	24%	29%	18%	16%	(1.46)
Greenhouse Gas Mitigation	0%	0%	4%	17%	33%	25%	22%	(2.13)
Climate Change Adaptation Planning	0%	2%	2%	10%	26%	26%	34%	(2.63)
Climate Change Studies	0%	0%	1%	7%	20%	30%	41%	(3.17)

*Source: Environmental Business Journal 2017 Market Snapshot & Industry Trend Survey. Question was; Please rate what you believe the impact of the federal government will be on the following areas as they affect environmental markets or the economy in 2017-2018. *Index is a factor of weighted ratingsfor each response category.*

Impact of Trump and Congress on Economy & Policy in 2017-2018

	Major Increase	Modest Increase	Marginal Increase	Not Much Change	Marginal Decrease	Modest Decrease	Major Decrease		Increase	Decrease
Partisan Divide in DC	41%	34%	7%	12%	1%	2%	2%		82%	6%
Partisan Divide in America	35%	34%	11%	13%	4%	1%	4%		80%	7%
U.S. Oil & Gas Production	14%	37%	36%	12%	1%	0%	0%		88%	1%
U.S. Manufacturing	11%	33%	30%	22%	2%	1%	0%		74%	4%
Military Presence Abroad	10%	34%	35%	7%	11%	2%	0%		79%	13%
Trade Barriers/Protectionism	14%	35%	31%	5%	7%	4%	5%		81%	14%
U.S. GDP Growth	6%	26%	39%	18%	9%	2%	0%		71%	11%
U.S. Exports	0%	26%	30%	30%	12%	2%	0%		56%	15%
U.S. Imports	0%	2%	15%	45%	32%	6%	0%		17%	38%
U.S. Role in Multi-Lateral Orgs	0%	2%	12%	23%	44%	10%	9%		15%	62%

Source: Environmental Business Journal 2017 Snapshot Survey: Question was: Rate what you believe the impact of the federal government will be on politics or the economy in 2017-2018

policy, tax reform and the military are all well into the bottom 10 of priorities for citizens: Again areas where significant political capital would need to be expended to get anything done on a legislative scale because of thin public support, and where impatient leaders will not be rewarded with higher approval rating for being on the wrong side of an issue.

And while infrastructure is not a specific item on the Pew list, transportation is, and it ranks 19th of 21, indicating that while support to advance America's infrastructure seems to be taken for granted by both sides, the challenge of financing it from a public perspective remains daunting. Last, while the priorities for many issues are similar across party lines, it is not surprising that climate change shows the widest partisan divide. Only 15% of Republicans consider action on climate change a priority, and it is certainly more than a social concern when many seem to regard clinging to 'climate change is a hoax' as some sort of badge of honor in conservatives circles.

GROWTH FORECAST AT 3-4%

So to craft an environmental industry forecast involves weighing numerous elements both subjective and quantitative, and even the quantitative have an element of subjectivity about them. The tables on page 1 and page 5 summarize the key factors past, present and future, and result in a forecast of growth in the environmental industry, in the consulting & engineering segment, and in the environmental infrastructure segments of 3-4% in 2017 and 2018, still measurably ahead of the consensus GDP forecasts in the low 2-2.4% range. The outlook for growth in the environmental contracting segments of remediation, industrial services and hazardous waste management is somewhat lower in the 1-2% range.

EBJ's 2017 Market Snapshot & Industry Trend Survey gives some insight on where the growth will likely occur based on the consensus of more than a hundred environmental industry executives polled in February and March 2017. Survey respondents first tackled a series of questions relating to the expected impact of the Trump Administration and Congress

Environmental Services: Key Growth Factors

	2004-2008	2009-2010	2011-2013	2014-2016	2017-2018
Economic Growth (GDP)	+	- -	+	+n	+n
Property Values	++	-	-	+	+
Federal Government Spending	+	+	-	n	n-
Oil & Gas, Commodity Prices	++	- -	+	- -	n
Construction Activity	+	- -	+	++	+
State & Local/Infrastructure	+	-	-	n	+
Environmental Policy & Regulations	-	n	n+	n+	- -
Average C&E Growth	6.8%	-0.7%	2.2%	2.3%	3.4%
Average Env'l Contracting Growth	3.4%	0.1%	2.7%	0.2%	1.5%
Average US GDP Growth	2.2%	-0.3%	1.9%	2.1%	2.2%
Construction Activity	6.8%	-13.2%	4.1%	8.6%	5.3%

Source: EBJ, Environmental Industry Summit 2017 presentation by Grant Ferrier

Key Trends in Growth Factors in 2017-2018

GDP & Real Estate: Even today's most optimistic forecast by economists is still not much more than a 2.5% annual growth rate for the U.S. GDP with the Global GDP growth only somewhat higher as the gap has narrowed. Commercial and residential real estate development will continue to be stronger on the coasts and sector-dependent.

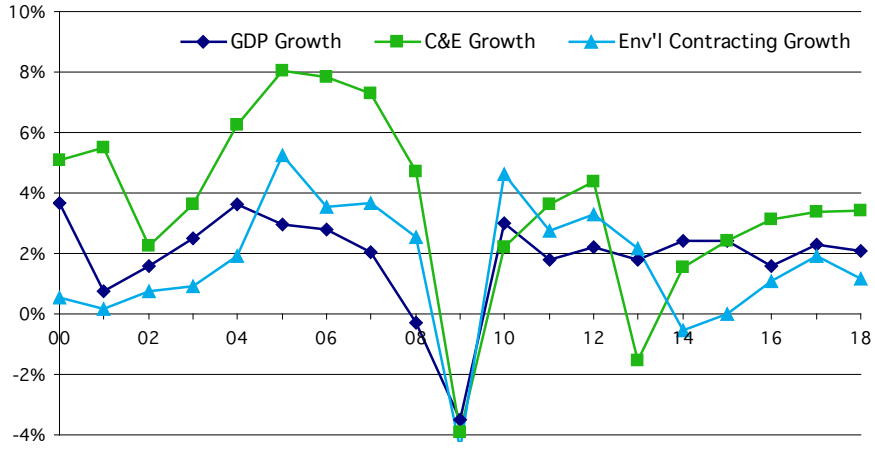
Federal and S&L Markets: DOD budgets look the most likely to grow, but the outlook for funds for cleanup & closure and energy programs is uncertain; Cuts in most other departments are expected but anything above 5% would be unlikely to get through Congress; Regional economic growth leads to state & local market growth with prospects for transportation, water and other infrastructure the most promising

Oil & Gas: Domestic production benefits from second shale revolution; Growth in upstream, midstream and downstream as U.S. companies target investment and exports

Commodities: Some rebound in mining; Trade spats put more focus on local supply in many commodities, especially food, materials and manufactured goods

Environmental disasters and impacts of climate change: Tick-tick-tick

C&E vs. Contracting vs. GDP Growth: 2000-2018



Source: Environmental Business Journal annual analysis of the environmental consulting & engineering industry based on market analysis and revenue information from more than 700 C&E companies

on federal departments, agencies and programs and then on general economic and policy issues and last on environmental markets. The results presented here on the Trump Effect on page 3 and 4 unsurprisingly mirror the stated objectives of the post-election and post-inauguration declarations, with the firm affirmation that in terms of markets, infrastructure is the place to be.

Climate change policy will get little love, but somewhat unexpected is that the momentum around renewable energy markets is expected to decrease with roughly one in ten respondents even expecting a 'major decrease'. This in spite of the quotes and tweets from Trump that he just loves solar power and renewable energy.

Energy prices continue to be a economic issue of significant impact to the environmental industry, and it appears that the Trump Administration and the U.S. oil & gas industry at the upstream, midstream and downstream levels are committed to expanded production and advancing their collective influence on global supply and prices. It also appears that while the industry itself would prefer higher prices, the administration likely will tolerate crude oil price hovering around $50 a barrel for the sake of re-shoring manufacturing, increasing employment in the Rust Belt states that gave Trump the election and moderate gasoline prices for consumers. Other commodities remain a factor and the depressed prices in mined commodities have rebounded somewhat recently,

Ranking of Global Environmental Markets by Region

	2013 Rank	2014 Rank	2015 Rank	2016 Rank	2017 Rank
China	4	2	3	4	1
India	9	3	2	1	2
Southeast Asia	7	8	4	6	3
Australia/NZ	6	14	10	7	4
Germany	18	16	9	2	5
Japan	17	17	14	10	6
Nordic Europe	18	16	9	3	7
Africa	10	13	15	12	8
South America	3	5	7	17	9
UK	18	16	9	5	10
Central America	8	10	6	18	11
Brazil	2	4	8	19	12
Middle East	5	12	11	14	13
France	18	16	9	8	14
Southern Europe	18	16	9	9	15
Eastern Europe	15	15	17	15	16
Russia	16	18	18	20	17

Source: Environmental Business Journal annual EBJ Snapshot Surveys;"prospects for growth in the next two years". Note: Categories have changed with the subtraction of USA and 'developing countries' and 'OECD' and 'non-OECD' countries, and the breakdown of western europe into smaller individual national markets or regions.

Ranking of U.S. Regional Markets

	2013 Rank	2014 Rank	2015 Rank	2016 Rank	2017 Rank
US: Gulf Coast/Texas	1	1	1	8	1
US: Southeast	3	2	2	2	2
US: Southern California	4	3	3	1	3
US: Mid-Atlantic	7	4	4	6	4
All United States	5	9	9	5	5
US: Northern California	2	5	5	3	6
US: Pacific Northwest	8	7	7	4	7
US: Rockies	6	6	6	10	9
US: New England	11	10	10	7	9
US: Southwest/Desert	9	11	11	9	10
US: Midwest	10	8	8	11	11

Source: Environmental Business Journal annual EBJ Snapshot Surveys;"prospects for growth in the next two years"

Ranking of Environmental Markets by Media

	2016 Rank	2017 Rank
Water	4	1
Energy mgmt/efficiency	3	2
Wastewater	10	3
EHS/Industrial hygiene & safety	11	4
Solid waste mgmt	14	5
Natural resources	8	6
Hazardous waste mgmt.	13	7
Remediation	12	8
Sustainability/CSR	9	9
Environmental information	5	10
Renewable energy	2	11
Air quality	1	12
Climate adaptation/resilience	6	13
Climate/carbon: mitigation	7	14

Source: Environmental Business Journal annual EBJ Snapshot Surveys;"prospects for growth in the next two years"

EBJ Respondent Opinion On Crude Oil Prices 2017-2030

Q1-2 2017	$53
Q3-4 2017	$54
Q1-2 2018	$57
Q3-4 2018	$60
2019	$64
2020	$68
2025	$70
2030	$69

Source: Environmental Business Journal 2017 EBJ Snapshot Survey; Oil Prices:What range do you think crude oil prices will be in the following time frames? (Note: Brent Crude prices in 2011-2012 were $80-105/bbl, 2013-14 was $100-120/bbl until July 2014 when it fell steadily to $45/bbl in January 2015, going back up to $65 in May 2015, falling to $28 in Jan/Feb 2016, moving up to $50 by mid-2016 and leveling off at around $55 in Jan-Feb 2017.)

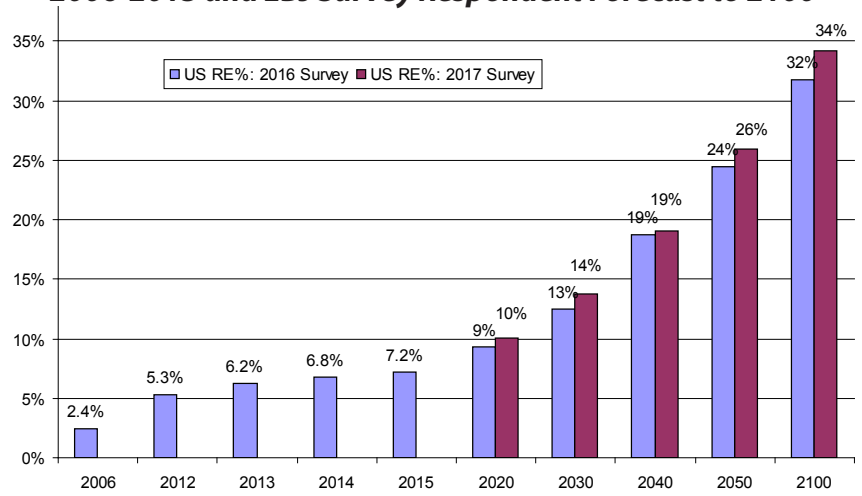
and those sectors are expected to remain on a modest upward trajectory with more investment in industry and construction.

Direct government spending clearly is compromised at the federal level (outside of Defense, Homeland Security and Border Patrol where dismantling the administrative state seems to not apply) as one of the major objectives of the administration is to cut overall spending. How this reconciles with the yet-to-be proposed details about a major infrastructure investment plan supported by, and to some extent instigated by federal funds remains to be seen. One element of tax reform that will likely have an impact on stimulating Private Public Partnerships (P3) for infrastructure investment are tax credits, but tax credits alone will hardly move the needle on private investment in infrastructure, and tax reform will generally focus more on lowering the corporate tax rate, the rate on the highest earners and simplifying the tax code for all Americans.

The ability of state and local governments to expand their investment in infrastructure is a function of their particular tax base and local economic conditions, but the approach of the federal government will play a role in how shovels hit the ground and who pays for those shovels, the boots that drive them and the plans that direct them.

State transportation authorities and

Non-Hydro Renewables as a % of U.S. Electricity Generation: 2006-2015 and EBJ Survey Respondent Forecast to 2100



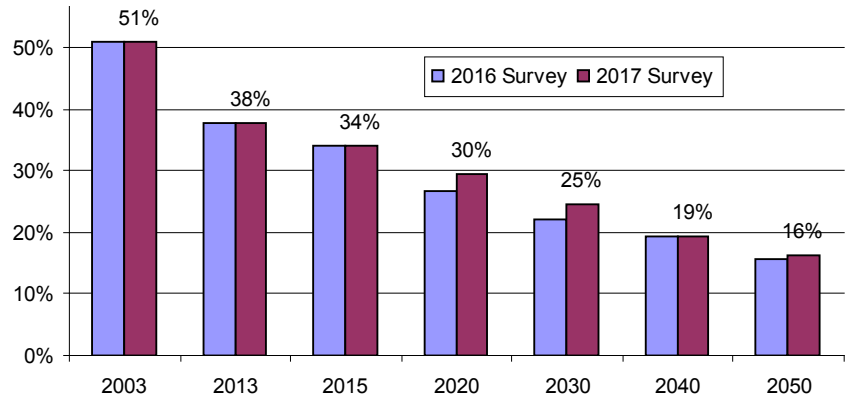
Source: EIA and EBJ 2016 and 2017 Snapshot Surveys; U.S. Energy Information Administration says non-hydro renewable sources grew from 2.4% of U.S. electricity generation in 2006, to 7.2% in 2015 and 8.4% in 2016, largely on the growth of wind. EBJ survey question was:What percentage of U.S. electricity generation do you believe non-hydro renewable sources will represent in 2020-2050 and 2100? (RE here includes wind, solar, geothermal, waste, landfill gas, wood & biomass and not hydroelectric: 2016 US electricity generation shares were 30.4% coal, 33.8% natural gas, 19.7% nuclear and 6.5% hydro and non-hydro RE was 8.4%

Renewable Energy of US Electricity

	2020	2030	2040	2050	2100
2014 Survey	8%	10%	14%	20%	27%
2015 Survey	9%	12%	15%	21%	30%
2016 Survey	9%	13%	19%	24%	32%
2017 Survey	10%	14%	19%	26%	34%

Source: Environmental Business Journal annual EBJ Snapshot Surveys;What percentage of U.S. electricity generation do you believe non-hydro renewable sources will represent in 2020-2050? (RE includes wind, solar,geothermal, waste, landfill gas, wood & biomass: 2016 US electricity generation shares were 30.4% coal, 33.8% natural gas, 19.7% nuclear and 6.5% hydro; non-hydro RE was 8.4%.

Coal: % of US Electricity Generation 2000-2050



Source: Environmental Business Journal annual EBJ Snapshot Surveys; U.S. DOE's Energy Information Administration says coal was 50% of U.S. electricity generation as recently as 2005, was down to 37-39% in 2012-2014 and 34% in 2015, largely on the growth of generation from renewables and natural gas.What percentage of U.S. electricity generation do you believe coal will represent in 2020-2050?

various port authorities or their equivalents are expected by EBJ survey respondents to drive growth considerably more than state and local governments themselves. Transportation and port authorities as client markets rated by respondents for their growth prospects in 2017-2018 and exhibited on page 8 are still only at the bottom of the top third of clients ranked, behind water utilities and power utilities as other infrastructure-related segments, and well behind the oil & gas industry that ranks across the top along with the IT sector, chemicals and healthcare as top markets.

The chart at the right also illustrates the change in ranking that each of the 33 markets have registered over the past five years. A notable change, besides the decline and rise the oil & gas business and the relatively recent rise of manufacturing sectors, is the fall of renewable energy and education out of the top 10 and down to the bottom 10. Subsidies are expected to be targeted in renewable energy and more private influence in education is expected to compromise those markets for capital spending in new construction, but also in energy investment and traditional environmental categories and like remediation and asbestos abatement.

REGIONAL MARKETS

Regional market rankings for growth in the next two years also have undergone a similar change in that the Gulf Coast took the same roller coaster ride, again demonstrating the influence of the domestic oil & gas markets on the environmental industry. Coastal markets have generally been driven by real estate development at the commercial and residential levels, but the strong position of California markets is also a factor of technology sectors and already approved transportation infrastructure projects funded by both state and city governments like high-speed rail and numerous transportation projects in LA.

The year 2016 also saw the debut of regional Environmental Industry Summits hosted by EBJ in Seattle in July and Boston in December, where regional markets and their notable differences where confirmed as key factors to competing and growing in each market. Investment in commercial property in Boston, Cambridge and surrounding areas was a big driver in that region, as well as traditional strength in the biotech and healthcare segments. In the Pacific Northwest the influence is spread among the transportation authorities of Washington and Oregon as movers of the market, the still relatively healthy real estate development environment, the hub of tech companies, and the impact of the presence of major corporations like Microsoft, Boeing, Starbucks, Amazon, Costco and others and the impact of them and their employees on local markets, development and investment.

Globally China and India remain intriguing opportunities with growth prospects expected to remain strong, but still only a small minority of environmental service and equipment companies are making investments of any significance there, and only a minority of those are indicating any early returns of sustainable long-term business models under their control. The

Ranking of Environmental Markets by Client

	2013 Rank	2014 Rank	2015 Rank	2016 Rank	2017 Rank
Oil & Gas Midstream (pipe/term)	1	2	10	31	1
Electronics/computer mfg/tech	14	20	7	15	2
Chemical	9	5	3	11	3
Oil & Gas Upstream (E&P)	1	1	27	33	4
Oil & Gas Downstream (refineries)	6	6	19	28	5
Healthcare	2	3	1	2	6
Transportation mfg (auto & aero)	17	21	8	12	7
Federal government: DOD	32	33	25	24	8
Water utilities	8	8	4	3	9
Banks & Law Firms	22	22	18	17	10
Power utilities	5	7	5	4	11
Port authorities	12	10	12	6	12
Transportation authorities	17	16	13	14	13
Consumer products	20	18	16	9	14
Property developers: commercial	19	14	9	10	15
Property developers: residential	18	17	15	7	16
Hospitality	13	12	11	5	17
Food & beverage	11	11	14	13	18
Other manufacturing	21	15	21	20	19
Metals fabricating/coating	24	26	24	23	20
Mining	7	24	32	32	21
Primary metals	10	25	23	30	22
Solid waste utilities & companies	16	9	17	16	23
Petroleum retail/gas stations	23	27	31	29	24
Education	na	13	6	8	25
State government	27	28	22	21	26
Major retailers	25	19	26	19	27
Renewable energy development	3	4	2	1	28
Pulp & paper	31	29	33	26	29
Local government	28	23	20	22	30
Federal government: DOE	30	30	30	18	31
Federal government: Other	29	31	29	25	32
Federal government: EPA	26	32	28	27	33

Source: Environmental Business Journal annual EBJ Snapshot Surveys;"prospects for growth in the next two years"

ascension of Europe up the charts is also promising, with Germany and the Nordics leapfrogging Latin America and the United Kingdom where Brexit issues drive uncertainty in future growth.

Forecasting markets by media show that in the opinion of environmental executives surveyed by a EBJ, climate adaptation and greenhouse gas mitigation markets now fall to the bottom of the pile (p.6), but notably falling further is air quality which tumbled from the number one ranked media category in 2016 due to the expectations of EPA's now seemingly doomed Clean Power Plan. Water and wastewater have moved up to the number one and three positions respectively, but the ranking of other media categories appear more a random grasping at straws in traditional environmental markets, although the growth in manufacturing certainly validates relatively more growth in traditional EHS work in those sectors and development of real estate, infrastructure and oil & gas projects certainly drive more project work in the natural resource market, despite the anti-regulatory rhetoric.

The trajectory of energy markets has entered a new era of speculation with the onset of the Trump Era. The decarbonization of the economy has been wiped out of the short-term equation much as climate change has been wiped off U.S. Department of Energy websites. While candidate Trump did shake some grandstands with his promise of the return of coal jobs, the 2017 EBJ survey only validates the most likely scenario that growth will not return, but that the decline of coal will only gradually be slowed by the eventual abandonment of the Clean Power Plan as drafted by the Obama Administration (see charts on p.7). The adjoining RE question on the EBJ survey however, indicates that environmental industry executives expect only upward trajectory in their assessment of renewable energy's future as a percentage of U.S. electricity generation, with those numbers steadily increasing with each year's successive polling, leading to one third by 2100. The Trump Effect may slow momentum in renewable energy but not growth, kind of like what is expected for the entire environmental industry. □

WS ATKINS PUTS INFRASTRUCTURE, CREATING PLACES, SUSTAINABILITY AND WELLBEING AT THE CORE OF ITS VALUE PROPOSITION

WS Atkins plc *(Epsom, U.K.) is a design, engineering, and project management consultancy employing about 18,000 people at offices in the United Kingdom, Europe, the Middle East, Asia and North America. The company provides a broad range of services to the public and private sectors, with markets served ranging from transportation, healthcare, energy, and power to environment, healthcare, education, tourism, water/wastewater, and urban development. The company generated revenue totaling £1.36 billion for the fiscal year ending on March 31, 2016, and it ranked at number 15 on Engineering News-Record's list of the largest international design firms in 2016.*

George Nash is Atkins' CEO for the company's North American business. He joined Atkins in October 2016, bringing more than 30 years of experience providing a wide range of consulting, engineering, design, construction and commissioning services. His executive roles have included senior business development, operational, and profit and loss responsibilities. He was formerly with AECOM where he served as Group President of Energy, Infrastructure and Industrial Construction. Prior to AECOM, he was with URS Corporation as President and COO of the Energy & Construction Division. A registered professional engineer, he earned his Bachelor's degree in Mechanical Engineering from Brown University. (Responses were provided by Mr. Nash prior to the announcement of the SNC Lavalin deal outlined on p.10.)

EBJ: Describe Atkins' value proposition.

George Nash: Atkins is one of the world's most respected design, engineering, and project management consultancies. We work with our clients and partners to transform vision into reality so that people's lives are enriched through the implementation of our ideas. The company works across the infrastructure lifecycle, planning every aspect of a project and designing physical structures ranging from schools and bridges to roadways and energy facilities. Based on our strong track record and more than 75 years of experience, clients entrust us with helping them solve some of their biggest, most critical projects, ensuring that deadlines are met, costs are controlled, and success is delivered. The core of our work is creating places for people, and delivering the latest in green infrastructure to enhance our health, wellbeing, and environment. We focus on improving environmental management performance, risk and liability management, and competitiveness for our clients, helping to deliver savings and efficiencies in time, cost, and resources and creating a better environment for us to live.

EBJ: So sustainability is a core part?

Nash: Yes. A holistic, long-term approach to assessment and solutions based on a sound understanding of the complex interactions between economic, social, and environmental issues is essential if sustainable outcomes are to be achieved. The early integration of sustainability considerations into a policy, plan, or project development process is also critical to ensuring a long-term livable future.

Our global network of experts is at the forefront of the international climate change debate and advises governments on policies and methodologies to both adapt to climate change and to mitigate its impact. We help businesses respond to new government measures as well as proactively drive the journey to a low carbon economy.

EBJ: Who are the company's principal competitors, and how would you describe the company's differentiators vis a vis that competition?

Nash: Due to the breadth of activities that the group undertakes, competitors are generally sector- or service-specific. Each

region of the world is characterized by a small number of large players, often with multinational reach, together with a large number of smaller companies that tend to have very specific niche skills. Typically, therefore, competitors at the local level are divisions of large companies or smaller privately owned specialists.

We strive to put our clients at the center of what we do, work more collaboratively, and exploit technology wherever we can to secure our future profitable growth.

Health and wellbeing is at the core of our infrastructure and built environment design services. Creating places for people through the implementation of green infrastructure and environmentally led plans and designs is being driven by consumer demand for a better quality of life. Atkins is leading the drive to improve our enjoyment of the environment through environmentally led and holistic design solutions and by producing guidance like Wellbriefing and Future Proofing Cities.

EBJ: How much revenue did Atkins generate in its most recently completed fiscal, what was its profit level, and how much did each grow year over year? What are you projecting for the current fiscal year in terms of revenue and profit growth? How have the environmental segments been performing relative to the overall company?

Nash: For the year ending March 2016, the group's revenue was up 6% to £1.86 billion, underlying operating profit was up 10.5%, and we achieved our 8.0% margin target. Underlying profit before tax was £139.0 million, ahead of market expectations.

At the half year point of 2016/2017: Despite challenges in some markets, we have delivered good underlying profitability, and the near-term outlook in our U.K. and North America businesses is particularly positive. We are confident that our focus on differentiation in nuclear, digital innovation, and advisory services will deliver further growth over the longer term. We remain confident for the year ahead despite continued uncertainty in some of our markets. We do not report on the environmental business as a sector.

Atkins Accepts April 2017 Acquisition Offer from SNC Lavalin

In April 2017, the board of the UK-based construction consultancy **WS Atkins plc** accepted a £2.1 billion offer for its business from **SNC Lavalin**, a Canadian construction and engineering group. The offer valued Atkins at £20.80 per share, a 35% premium on the £15.40 price that the shares closed at on the day before the news broke. SNC Lavalin said the merger would create a business with revenues of C$12.1bn and 53,000 employees worldwide and it expects to generate C$120 million in savings by combining the two businesses, C$80m of which is expected to come from Atkins. "This acquisition is fully aligned with our stated growth strategy of becoming a recognized E&C powerhouse," said Neil Bruce, CEO of SNC Lavalin. Canadian pension fund **Caisse de depot et placement du Quebec** (CDPQ), SNC's biggest shareholder, will extend a loan of C$1.5 billion to SNC and buy C$400 million of equity in the company to help finance the acquisition.

SNC had been scouting for an acquisition opportunity to cement its core engineering and construction business as it tries to put a bribery scandal permanently behind it under Mr. Bruce's leadership. The deal significantly improves SNC's overall margins and balances its business portfolio. Atkins will bring SNC new and complementary capability in three of its four business sectors with almost no overlap in its offering, SNC said. Atkins operates chiefly in Europe, Britain, Scandinavia, the United States, the Middle East and Asia. The combination "checks all the boxes," **Desjardins Securities** analyst Benoit Poirier said, allowing SNC to diversify its revenue outside of Canada and away from oil and gas. Buying Atkins also reduces SNC's business risk profile because it adds ongoing revenue streams from framework and master service agreements for consulting and advisory services, the company said. Risk is also reduces as SNC absorbs Atkins's fixed-fee consultancy and design projects, SNC said. "This is the de-risking event we and the market have been looking for," agreed **National Bank Financial** analyst Maxim Sytchev.

SIGNIFICANT MIDEAST PRESENCE

Atkins and SNC Lavalin have a significant presence in the Middle East, and the combined business will have more employees in the Middle East and Africa than any other global region – 19,625. The company said it expects to generate about 20% of its business from this region once the deal is completed. SNC Lavalin's regional chief executive Alan McLean said it employs about 11,000 staff in the Middle East and generates about 15% of its revenue from the region. Most of these staff are contractors who had previously worked for the Kentz business acquired by SNC Lavalin for £1.2bn in 2014. The energy sector remains its biggest source of regional revenue, followed by infrastructure projects. Atkins employs 2,400 people in the Middle East and earns 14 per cent of its global revenue of £2bn from this region. It is working on projects such as four new economic cities in Saudi Arabia for the Economic Cities Authority, the Riyadh and Doha metro projects, and the Port Sultan Qaboos redevelopment in Oman.

The construction and engineering consulting business has undergone a wave of consolidation in recent years as firms pursue global scale. **AECOM** completed a $6 billion takeover of URS in October 2014,, the same month **WSP** completed an £820 million buyout of the US-based Parsons Brinckerhoff from British contractor **Balfour Beatty**. Dutch firm **Arcadis** acquired Hyder and project management firm EC Harris in recent years, **Stantec** made waves in March 2016 wth the purchase of MWH Global (p.30), and in March 2017 $4.9-billion **John Wood Group** agreed to acquire Amec Foster Wheeler in an all-share deal worth $2.7 billion. Meanwhile **WorleyParsons** whose 2016 revenues declined 11% to $7.8 billion, announced that it had rebuffed a takeover offer from Dubai-based **Dar Group** which already owns a 13.5% stake. Analysts expect more to come in E&C M&A.

EBJ: What were some of the biggest highlights for the company over the past year or so, particularly with regard to the environmental practice?

Nash: As a deliverer of large complex infrastructure projects, examples of our key projects are the following:

High Speed 2 (U.K.): As part of a joint venture, we are the engineering delivery partner for the Phase One work. This includes the environmental management of the project.

Crossrail (U.K.): We are working on the new east-west railway under construction beneath London, comprising upgrades to 90km of existing surface railway and 21km of new twin bore tunnels along its route. The project includes upgrades to 30 existing stations and construction of 10 new stations in London.

Thames Tideway Tunnel (U.K.): We are working on a new 25 kilometer "super sewer," which will benefit the ecology, public health, the environment, appearance, and the economy.

Swansea Bay Tidal Lagoon (U.K.): We've been appointed as the engineer, providing specialist design and engineering support acting on behalf of the client, including producing outline designs for the breakwater, turbine house, and ancillary works and supporting the tender process by helping develop documents and reviewing responses and detailed designs.

Duqm City, Oman (Middle East): Atkins is working on the first phase of developing the city of Duqm, currently a port town in central-eastern Oman undergoing significant growth with a goal to increase its population from 12,000 in 2010 to 100,000 by 2020. Atkins' work includes the detailed city master plan, a strategic environmental assessment, sustainability assessment, concept design, tourism strategy, transport master plan, and drainage plan.

Beijing Air Quality Improvement program (Asia Pacific): Atkins conducted a program preparation report to assess the potential environmental impacts of policy actions taken by the Hebei provincial government to tackle the longstanding air pol-

Atkins: Recent Mergers & Acquisitions

2016		
Projects, Products and Technology division of EnergySolutions (PP&T)	US	Nuclear engineering $318 million; 650 employees
2014		
Houston Offshore Engineering LLC	US	Offshore oil and gas engineering $73 million; 150 employees;
2010		
PBS&J	US	Multidisciplinary C&E $280 million, 3,500 employees
2011		
Pöyry oil & gas operations	Finland	Engineering design/operational support; €17 million, 130 employees
1996		
Faithful & Gould	UK	Project management £21 million; 850 employees

Source:Atkins investor presentations and annual reports

WS Atkins: 2016 Financial Performance

	External Revenues £m	Operating Profit £m	Operating Margin	Revenue Growth
4/1/2016-9/30/2016				
UK and Europe	448.2	39.4	8.7%	2%
North America	219.8	15.3	6.9%	24%
Middle East	111.5	6.6	6.3%	-19%
Asia Pacific	55.3	4.1	7.2%	20%
Energy	155.4	8.4	5.4%	47%
Total	**990.2**	**73.8**	**7.5%**	**9%**
4/1/2015-9/30/2015				
UK and Europe	438.8	29.8	6.5%	
North America	177	8.5	4.8%	
Middle East	137	11.3	9.5%	
Asia Pacific	45.9	3.4	6.6%	
Energy	105.9	7.1	7.3%	
Total	**904.6**	**60.1**	**6.6%**	
4/1/2015-3/31/2016				% of Revenue
UK and Europe	906.9	73.8	7.8%	49%
North America	362	20.4	5.6%	19%
Middle East	285	29.5	11.9%	15%
Asia Pacific	94.6	8.5	8.0%	5%
Energy	213.4	16.7	8.3%	11%
Total	**1,861.9**	**148.9**	**8.0%**	

Source:Atkins half year financial report for the six months ended 30 September 2016

lution in the greater Beijing capital area, which helped secure a loan of $300 million U.S., the first ever policy-based loan to the People's Republic of China (PRC) from the **Asian Development Bank**.

In the Kingdom of Saudi Arabia, we designed a master plan for the Prince Sultan Cultural Center which incorporates all the components needed for a strong community: residential; culture; healthcare; education; retail; offices and commercial space; exhibition and hospitality; and an integrated public realm network. The idea behind the project is to create a new type of community for the kingdom that encourages ownership and involvement from everyone in order to promote physical and mental wellbeing. Every element within the master plan has to meet these wellness criteria in order to create a city within the city of Jeddah—a fully self-sustaining mixed-use development.

We're using innovative design to help maximize energy yield for the Swedish company **Hexicon** on the world's first multi-turbine offshore wind floating platform at the Dounreay Tri Project off Scotland's north coast. Also in the wind market, for **Statoil**, we are working on the Hywind project, the world's first floating wind farm. It consists of five 6-megawatt turbines that will generate enough power to supply some 20,000 households.

In the United States, Atkins will prepare the environmental impact statement (EIS) for the proposed Jasper Ocean Terminal, located on the Savannah River in Jasper County, South Carolina. It is expected to be one of the largest ports on the East Coast—able to support vessels that are double the size of what is currently possible at neighboring ports. The EIS will help evaluate the project's potential socioeconomic and natural environmental impacts such as sea-level rise, scenery impacts, protected species and habitat, socioeconomic issues, transportation impacts, noise and vibration, and air quality.

We're also providing design and construction management services for the West Point Cadet Barracks Upgrade program. Energy-savings features and high-efficiency, low-flow plumbing fixtures will help the barracks achieve the Leadership in Energy and Environmental Design (LEED) Silver certification. We're also providing architecture and engineering services for a new wastewater treatment plant (WWTP). Because West Point is a designated pilot installation for the U.S. Army's Net Zero sustainability initiative, all energy consumed in operating the new WWTP will be partially offset through alternative energy systems. The facility will generate power using methane gas, a by-product of the treatment process. To increase methane production, food scraps will be utilized from the cadet mess hall and other post dining facilities.

We are also the lead designer on Project Neon near Las Vegas, the largest, most ambitious and most important project in the **Nevada Department of Transportation**'s history. With 300,000 vehicles per day making 25,000 lane changes per hour, this is the busiest stretch of highway in Nevada. The $1.5 billion construction project will widen 3.7 miles of interstate to boost safety, mobility, and accessibility to downtown Las Vegas and prepare for future traffic, which is expected to double by 2035.

In addition, we were one of three firms selected for the $5 million program management contract to champion the **Colorado Department of Transportation**'s (CDOT) RoadX program—with plans to deploy advanced technology to reduce the cost of transporting goods by 25%; to turn a rural state highway into a zero death road; and to reduce congestion and vehicle emissions on Colorado's critical corridors.

We are also providing civil and transportation engineering services for Orlando International Airport's South Automated People Mover Complex, part of the future $1.1 billion South Terminal Complex (STC) being constructed to increase the airport's capacity. The ultimate STC program will serve as a hub for three passenger rail projects, including a planned $2.2 billion intercity passenger rail line from Miami.

In Georgia, we are managing the $250 million Renew Atlanta Bond program, the most significant investment in the city's above-ground infrastructure in more than three decades. The program will fix roads and bridges, build more than 30 miles of complete streets projects and bicycle lanes, and will synchronize Atlanta's traffic signals for the first time.

In Texas, we prepared the environmental assessment for the T**exas Department of Transportation**'s (TxDOT) Mobility35 Rundberg Lane to US 290E project, which will improve safety and mobility for the section of I-35 that runs through the center of Austin. This section of interstate serves as the backbone of the local, regional, and national transportation network and is currently the most congested highway in Texas.

And then in Colorado, we prepared the EIS for the $1.9 billion I-70 East project, one of the CDOT's highest priority projects in the Denver area and the largest in the state's history. The purpose of the project is to implement a transportation solution that improves safety, access, and mobility while addressing the congestion on the 13-mile section of interstate, which is one of the most congested and heavily traveled in the state.

EBJ: What's your balance of clientele among federal, state/municipal, and the private sector, and which private sector industries are best represented among that clientele? Are you seeing any major shifts in the balance among the three major categories, and if so, why?

Nash: Again, this differs for each region. For example, in the United Kingdom and Europe, we have a mix of government and local authority clients, alongside some public-private partnerships and purely private clients. The U.K. government recently published an ambitious industrial strategy, and we are looking forward to working with the government and other clients and partners to make this happen.

In North America, the new U.S. administration's pledge to address infrastructure needs has the potential to positively affect publicly and federally funded work; it is still unknown how the private sector may be affected. However, with the administration seemingly favoring public-private partnerships and other alternative contracting methods, the private sector may be incentivized to invest in the infrastructure projects to come.

EBJ: What are the "hottest" opportunities now, and what's driving them?

Nash: Urbanization is a major driver. The rise in population will be felt most in our cities, largely in the developing world. In 2014 the world crossed the point at which more than 50% of the population live in an urban area. By 2030, 60% of the global population will live in cities, and vehicle ownership will double by 2030 to 2.4 billion. Developing and maintaining effective cities and infrastructure has never been more important.

Demographics is another driver. There are implications for how we work as the needs of the population and infrastructure change, with the global population expected to rise from seven billion people today to nine billion by 2050. And then there are resource issues. Lower fossil fuel prices in the near term and the longer-term move to energy production, with a lower carbon impact providing engineering challenges.

Advances in technology and widespread digital communication promote innovation across the industry and is core to the work we undertake at Atkins, so innovation is a driver. And then infrastructure and mobility: with the new administration pledging $1 trillion in infrastructure work, there will be an emphasis in many states on addressing infrastructure issues, including exploring intelligent mobility options.

EBJ: What kinds of innovations have you seen in contracting methods in recent years, and how are you responding? Are some innovations better suited to certain areas of the business than others?

Nash: Building information modeling (BIM) helps us to deliver innovation, improved design, and more effective construction methods. It is adopted throughout Atkins, and its use will continue to spread throughout the industry. BIM is the future of design and delivery.

Innovations and technology around intelligent mobility and smart cities are also gaining attention. We are supporting clients as they explore options around the technologies that continue to emerge. Industry has come a long way and we now work in close collaboration with many contractors.

EBJ: To what extent does sustainability "sell" with your clients?

Nash: We have incorporated sustainability principles that provide a clear direction for related activities across the group. The principles are based on three key themes: a society for our future, an environment with a future, and a responsible business of the future. A worldwide internal program puts our principles into action and focuses on health and safety, efficient and effective delivery of client solutions, environmental management, and continual improvement—all integral to our approach to sustainability. In the United States, we have architects, engineers, and planners who work in areas such as green roads, green buildings, and designing bike and pedestrian paths integrated into communities.

EBJ: To what extent, and in which business lines, is climate change a concern to your clients? How are you responding?

Nash: We're helping governments, businesses and society move to a low carbon economy and adapt to climate change. For example, for the government of Sri Lanka, we are helping to improve understanding of climate risk and develop a long-term investment plan to mitigate floods and drought risks. We are also working with "Sustainable Energy for All" (SE4All) on access to sustainable energy efficiency and energy supplies to facilitate the implementation of key investment projects, with a focus on sub-Saharan Africa.

Atkins also led a report to look at the next 50 years of water provision in the United Kingdom and consider the impacts of climate change, population growth, and abstractions that revealed a need to increase resilience to drought. The average cost of £4 per customer per year to increase resilience to severe drought, compared with the economic losses to businesses and other water users across England and Wales, priced at £1.3 billion per day. The report highlights a very clear benefits case—with a benefit/cost ratio at greater than 10:1.

In North America, our flood mapping software has enabled us to complete the engineering analysis and mapping for over 60,000 miles of floodplain for the U.S. government's **Federal Emergency Management Agency** (FEMA). We also initiated over 50 projects in 14 US states related to flood risk analysis, providing residents to and officials with information to help protect their communities. And we led the development of the first ever all-encompassing tsunami integrated loss modeling application for FEMA in the US to introduce guidelines and procedures at a regional scale.

EBJ: What are Atkins' strategic goals for the next 3-5 years? Is acquisition a part of the strategy, and if so, what strategic goals would acquisitions be designed to fulfill?

Nash: We will focus on revenue growth and selectively increase our geographic footprint and capabilities through targeted expansion, both organically and by acquisition.

EBJ: What's your outlook for 2017? Does the outcome of the U.S. presidential election make any difference?

Nash: For the group, we remain confident for the year ahead despite continued uncertainty in some of our markets. In the United States, while we saw a slowdown ahead of the U.S. election, the fundamentals in the market are positive with infrastructure improvement set as a priority for the new administration. A number of ballot initiatives to fund transportation projects were passed during the November 2016 election in geographies that are strategic growth areas for our North America business, and we will be tracking developments around them closely. We will also continue to track other funding initiatives at the state level.

Indications are that the Trump administration will begin to unveil details of an infrastructure funding plan soon, which would consist of investing $1 trillion over the next 10 years through tax credits to private firms. One of the top priorities for the new administration is to form an infrastructure task force and to look at financing options using innovative financing tools such as public-private partnerships (P3s). The incoming administration recognizes the need to eliminate current legal and regulatory roadblocks that can slow down projects. □

CLEAN HARBORS OPENS FIRST NEW HAZ WASTE INCINERATOR IN 20 YEARS WITH $120 MILLION INVESTMENT; BUSINESS LOOKING UP

Clean Harbors *is North America's leading provider of environmental, energy and industrial services. The Company serves a diverse customer base, including a majority of the Fortune 500 companies across the chemical, energy, manufacturing and other markets, as well as numerous government agencies. Clean Harbors delivers a broad range of services such as end-to-end hazardous waste management, emergency spill response, industrial cleaning and maintenance, and recycling. Through its Safety-Kleen subsidiary, Clean Harbors also is North America's largest re-refiner and recycler of used oil and a leading provider of parts washers and environmental services to commercial, industrial and automotive customers. Founded in 1980 and based in Massachusetts, Clean Harbors operates throughout the United States, Canada, Mexico and Puerto Rico.*

EBJ spoke with Chief Operating Officer Eric Gerstenberg. Mr. Gerstenberg rejoined the Company in June 1999 as Vice President of Disposal Services of Clean Harbors Environmental Services, Inc. From 1989 to 1997, he held a variety of positions with the Company, and in 2010 was promoted to Executive Vice President, Environmental Services, overseeing Field Services, Technical Services, Disposal Facilities, Transportation and Sales for the Environmental Group. He was named President, Environmental, Industrial & Field Services in 2014. From 1997 to 1999, he was the Vice President of Operations for Pollution Control Industries. Mr. Gerstenberg holds a Bachelor of Science degree in Engineering from Syracuse University.

EBJ: Congratulations on Clean Harbors' EBJ Business Achievement Award but, more importantly, on the new incinerator and upgrading of the facility in Arkansas. Twenty years is a long time coming. In hindsight where there any more significant elements than over capacity 20-25 years ago in incineration, and the progress of waste minimization during that time spell that led to the 20-year gap?

Eric Gerstenberg: The 20-year gap is due to a combination of factors including cost, demand, permitting and regulations. For many, building a new incinerator to meet the stringent standards of the Federal Clean Air Act was cost prohibitive. We're extremely proud to break that streak by dedicating $120 million to our El Dorado, Arkansas, site – the largest capital investment in our company's history. We have built a state-of-the-art facility that not only meets the newest pollution control standards, but exceeds them. We hope our El Dorado facility becomes the model for future incineration facilities worldwide.

EBJ: What has been the basic trajectory of pricing over the last 20 years for incinerable wastes. And have the disposal volumes been relatively flat or have there been some spikes or valleys with impacts of the recession or any other factors?

Gerstenberg: Over the past 20 years, pricing in general has trended upward, particularly as capacity within the industry has tightened. It was one of the factors behind our decision five years ago to invest in the El Dorado expansion in the first place. Industry demand has climbed over the past 20 years due to incremental demand, increased regulations and the closure of many captive incinerators.

EBJ: As the clear leader in incineration as well as your platform in oil field wastes, services related to the supporting of domestic energy production infrastructure, Industrial Services, emergency response, and remediation, how do you seek to balance the stool of these business segments?

Gerstenberg: We're very fortunate in that regard. While we have multiple lines of business, they work hand-in-hand and, from a corporate perspective, we're able to benefit from this vertically integrated approach and opportunity to cross-sell our services. For our customers, we can offer a convenient one-stop shop – thereby providing a comprehensive solution with lower costs and greater responsiveness.

EBJ: What is your perspective on International opportunities? Are there too many unknowns and too many risks to make a major investment there?

Gerstenberg: Today, we remain focused on American and Canadian opportunities. We have evaluated international expansion, but we believe there remains a substantial runway for growth here in North America. As a company, we thrive in a compliance-driven environment. If we were to expand internationally in the future, it would most likely be in a country or region that had the appropriate level of regulations in place and enforcement mechanisms necessary to require environmental compliance by companies.

EBJ: In what ways do you team with consulting engineering firms or other environmental service providers?

Gerstenberg: Given our broad portfolio of services, capabilities and expansive geographic footprint, we frequently collaborate with engineering consulting firms and other environmental service firms. Whether it's disposal options, transportation capabilities, specialty industrial or environmental services, we often supplement what firms can offer and partner with them as a result. We also have a valuable network of qualified subcontractors who we call upon when we need to rapidly marshal considerable resources in a region.

EBJ: In what ways do you access new technologies for waste treatment or for onsite remediation as examples?

Gerstenberg: We value the importance of technology and innovation. Our El Dorado facility is a perfect example. Its world-class air pollution control technology is so advanced that the emissions at the top of the plant stack are amazingly only the equivalent of two idling cars, that despite the 70,000 tons of hazardous materials that can be run through the plant annu-

ally. In addition to our world-class plant, we're automating much of our equipment across all our business lines to create a safer and more efficient environment for our employees and customers.

EBJ: How has business been in general the past couple of years?

Gerstenberg: Despite ongoing weakness in both the industrial and energy markets over the past several years, our company has done a fantastic job at navigating through a challenging period. We are proud to have been recognized for various state and local safety achievements in 2016 and, of course, to complete the El Dorado expansion in December. This past year, we began selling packaged oil under our new Performance Plus brand. For many years, our Safety-Kleen subsidiary collected used oil and then re-refined it, but largely sold through distributors and other third-party channels. Through our OilPlus™ closed loop offering, we're now selling fully blended and packaged lubricants directly back to customers. Overall, our company remains focused on profitable growth.

EBJ: Now that the 'Great Recession' is almost a distant piece of history, how did the early crisis points and the subsequent economic slowdown affect your business?

Gerstenberg: We learned how important the diversity of our customer base is to our success. As manufacturers, chemical companies and overall production in the United States declined sharply, we saw continued strength in areas such as healthcare, education, infrastructure and government. That enabled us to weather the worst of the Great Recession better than many of our peers. We also had the financial wherewithal to complete a major acquisition of Safety-Kleen in 2012 when many companies were struggling. It expanded our industrial and energy offerings, which strongly benefitted us during the economic recovery following the recession.

The more recent oil crash that began in late 2014 has created a new set of challenges for us in Western Canada and U.S. shale plays. But, once again, the diversity of our business model has been protecting us and has enabled us to shift resources and capture growth in other areas.

Clean Harbors 2016 EBJ Business Achievement Award

Clean Harbors Inc. (Norwell, Mass.) was awarded a 2016 EBJ Business Achievement Award for completing construction of the first commercial waste incinerator to come on line in the past 20 years. The unit highlights a four-year, $120 million expansion at Clean Harbors' El Dorado, Ark. facility and is the most technologically advanced incinerator ever built in North America. It is Clean Harbors' largest investment in a facility in its 36-year history and brings 120 jobs to the area. New equipment nearly doubles the facility's capacity from 90,000 to 160,000 tons annually. Destruction in high-temperature incinerators has been determined by the EPA to be the Best Demonstrated Available Technology for safely destroying hazardous waste, and the company says the emissions from the air pollution controlled stack is equivalent to two vehicles idling in a parking lot.

EBJ: How about the lowered prices of commodities and oil & gas: We realize it was a challenge, but what impact has that had on your business and has it changed your approach at all?

Gerstenberg: The crash of commodity pricing was a challenge across many of our businesses and forced us to adapt quickly to an evolving environment. As a diversified company, we have been more insulated than many pure play companies, some of whom did not survive the downturn. The oil crash shifted the way we thought about our oil and gas facing business, as we were forced to right-size that organization by cutting costs and cascading assets to other areas. The decline in oil prices also dramatically affected our waste oil collection business, where we gather more than 200 million gallons of used oil annually. During the past several years, we led a paradigm shift in the industry from paying for oil to charging those same customers a service fee as a result of the fall in crude prices.

The volatility of the energy markets is also a factor behind our new OilPlus program – whereby we not only pick up the customer's waste oil but sell back to them the fully recycled oil. It is an all-encompassing strategy that enables us to better mitigate the ups and downs of energy prices. As we are the largest collectors of used oil in North America, selling that recycled oil back to customers opens up another natural, and more stable, source of revenue.

EBJ: What have been the best management initiatives you have instigated over the past few years to manage or overcome these market and economic challenges?

Gerstenberg: Our OilPlus closed loop offering for oil customers is likely the best example. Unlike base oil, which is a commodity product, blended lubricants have a much more stable profile. Prices don't fluctuate as much as base oil, which can move significantly on a week-to-week basis. Selling more of our Performance Plus brand of fully blended products will allow us to better weather future storms.

EBJ: How do you suggest the environmental industry best positions itself to attempt to work with or influence the new Congress and Trump Administration, or are efforts better spent at the state and local level?

Gerstenberg: We have branches in nearly all 50 states and across Canada – from the largest cities to the most rural of areas. We very much consider ourselves part of every community we're located in. While we are not significantly involved in lobbying efforts, we very much value having strong relationships with local and state leaders. Based on our North American footprint and 35 years in operation, we're accustomed to dealing with varying regulations from state to state or from country to country or from changes in administration. In terms of the Trump administration, we believe it is too early to tell, but it appears there will be less regulation at the federal level and more decision making will be put in the hands of local and state authorities.

EBJ: How do you feel about the progress (or lack thereof) we have made on envi-

ronmental issues in the past 40 years or so and the role the environmental industry has played?

Gerstenberg: When you look back 40 years, there has been an enormous amount of progress made on environmental issues. It was exactly around that time that many landmark regulations were put in place that allowed the United States to significantly advance environmental compliance and help clean up the sins of the past.

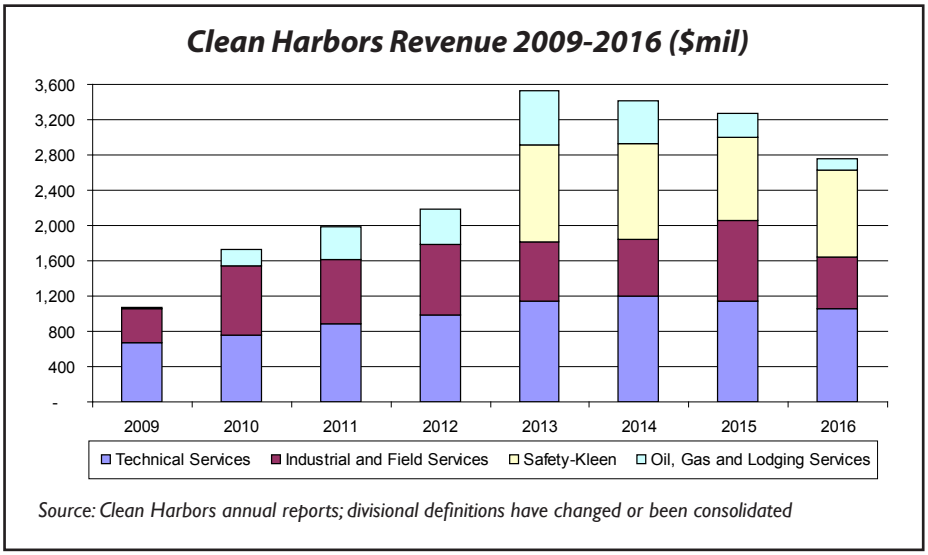
Congress passed the Resource Conservation and Recovery Act in late 1976. This was followed by major amendments to The Clean Water and Clean Air Acts in 1977. Then, in 1980, the federal government passed the CERCLA legislation that created Superfund cleanup sites. It was the "cradle-to-grave" responsibility that RCRA created and the associated environmental liabilities for companies that has really driven and substantially changed corporate behaviors in the past 40 years. It was that change in mindset and culture that enabled the creation of a company like Clean Harbors. We have thrived in a compliance driven environment where companies are responsibly handling, managing and disposing or, in many cases, recycling their waste. That has probably been the biggest change in the more recent decades—the shift toward recycling, whether that is glass, paper, cardboard, waste oil, aluminum, copper, solvents and many precious metals just to name a few. The environmental and solid waste industries have really been at the forefront of that move, particularly in recent years as companies continue to be more environmentally conscious and strive to be greener.

EBJ: What do you feel are the most pressing environmental and social issues today and in the longer term out to 2030?

Gerstenberg: From an environmental perspective, it is that ability to continue to recycle more. We see the benefit of it in our re-refining business. Every gallon of base oil we make from collected waste oil takes 80-85 percent less energy than making that same gallon of base oil from virgin crude oil. The world has a finite number of resources. The challenge society faces – particularly as the world's population continues to grow – is how to best capture and reuse those resources.

EBJ: What motivates you most in your work and how does that translate down to your employees and colleagues?

Gerstenberg: Safety is my primary motivation. For Clean Harbors, safety is at the forefront of everything we do – it's our number one priority. Our workers are our greatest resource and we do absolutely everything we possibly can to make sure all 12,000 make it home safely to their families every night. We've spent countless hours over the years to create our culture of safety at Clean Harbors to the point where employees here are thinking about it at all times – on the job site or at home. That's the case with an intern who was hired yesterday up to our CEO and everyone in-between. I do everything I can to motivate our workforce to be safe and their safe actions every day motivate me. Great work is safe work and I'm proud to say we have a phenomenal workforce that does great work across North America every single day without exception. Nothing gives me more pride to report than, last year, our safety statistics reflected the best safety record in our history and our 4th consecutive year of improved performance. We're motivated to improve that number every year until it's down to zero. □



Source: Clean Harbors annual reports; divisional definitions have changed or been consolidated

Clean Harbors Revenue 2015-2016

Revenue	2015 3rd Party	2016 3rd Party	Growth	2015 Direct	2016 Direct	Growth
Technical Services	$991,410	$906,495	-9%	$1,139,080	$1,056,735	-7%
Industrial and Field Services	$1,023,638	$618,245	-40%	$989,953	$582,215	-41%
Safety-Kleen	$1,060,926	$1,110,727	5%	$941,689	$996,083	6%
Oil, Gas and Lodging Services	$198,705	$116,692	-41%	$207,139	$119,883	-42%
Corporate Items	$458	$3,067	na	($2,724)	$310	na
Total	**$3,275,137**	**$2,755,226**	**-16%**	**$3,275,137**	**$2,755,226**	**-16%**

Source: Clean Harbors investor relations

VEOLIA ACQUIRES ENOVITY TO BRING USA HEADCOUNT IN ENERGY SERVICES TO 250

Veolia *is the global leader in optimized resource management. With over 174,000 employees worldwide, Veolia designs and provides water, waste and energy management solutions that contribute to the sustainable development of communities and industries. Through its three complementary business activities, Veolia helps to develop access to resources, preserve available resources, and to replenish them. In 2015, the Veolia group supplied 100 million people with drinking water and 63 million people with wastewater service, produced 63 million megawatt hours of energy and converted 42.9 million metric tons of waste into new materials and energy. Veolia North America revenue was $2 billion; Veolia Environnement generated $25.7 billion in 2016.*

Now leading Veolia North America's Municipal and Commercial business, John Gibson previously served as Senior Vice President for the South Region where he supported the water, wastewater and energy operations in the southern United States. Prior to this role, John served as the Vice President of Veolia Energy's South Region operations, where he oversaw, managed and supported energy projects in the region. John has been with Veolia since 1994, and has more than 25 years of experience in utility management and operations. John joined Veolia's energy business as a Marketing Engineer in 1994, and went on to serve in a variety of roles including Manager of Business Development, Director of Sales and Marketing and Vice President and Manager (in Baltimore and Atlanta). As a result, John has been involved a number of key Municipal and Commercial projects. These include an OM&M contract for a regional 90-MGD surface water treatment plant and a 200-MGD raw water pump station, a 9,795 lb/hr steam system for a commercial client and an OM&M contract serving more than 2.5 million people. Before joining Veolia, John worked at Aspen Systems Corporation, Air Products and Chemicals and the U.S. Navy. He holds a bachelor's degree in Aeronautical Engineering from the Massachusetts Institute of Technology, and a master's degree in General Administration from the University of Maryland.

EBJ: The acquisition of Enovity strengthens your position in energy services. What has been the history in energy services for Veolia compared to more familiar services like solid and hazardous waste and your water platform? Has your USA growth strategy recently been about building in your existing base of services to more clients, or expanding your client set overall?

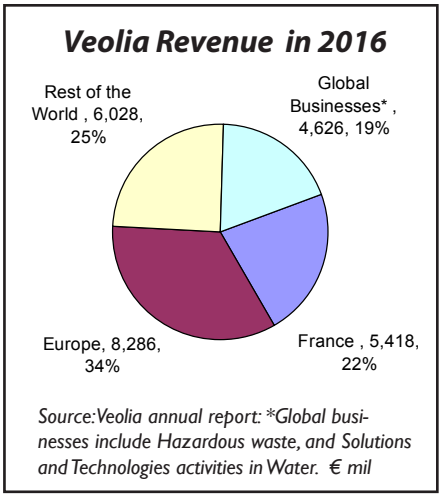
John Gibson: Beyond being an excellent fit in the services space, Enovity is a strong company in a market and business unit that's very important to Veolia - particularly from a growth standpoint. Strategically, this acquisition expands the company's presence on the west coast, one of the largest energy services markets in the United States. By adding to our existing base of business, we are now well positioned to enhance our role as a market leader in that space.

EBJ: How did you identify the company? How long was the process from first talking about it to a signed deal?

Gibson: Enovity is well known in this space.

EBJ: What other acquisitions have you done in recent years and what type/size have they been?

Gibson: Over the years we have completed a number of different acquisitions, including the purchase of SourceOne, Inc – a leading energy services firm with well-established operations in the Northeast. The Enovity acquisition is an excellent complement to that business. These assets not only position Veolia for growth in our target markets but also add top talent to our already robust pool of subject matter experts.



*Source:Veolia annual report: *Global businesses include Hazardous waste, and Solutions and Technologies activities in Water. € mil*

EBJ: How do you deal with the integration of smaller firms? Do you retain the name as a division of Veolia?

Gibson: Given the brand recognition of Enovity, the firm will retain its name as a company of Veolia.

EBJ: Do you actively start cross-selling or does that evolve with client relationships?

Gibson: We generally utilize existing business assets that are synergistic – in other words, tapping both companies, which often have similar customer bases and complementary product offerings. We then leverage those relationships and integrate the strengths of both companies as we go along.

EBJ: With North American gas and electricity prices relatively low and stable, what's driving building owners to invest in energy efficiency upgrades?

Gibson: The primary driver is today's energy markets, which vary from region to region. California, New York, and Massachusetts – three markets in which we have significant presences – have relatively high energy costs and regulatory support for sustainability initiatives. So, efficiency is a big consideration for businesses. Ultimately, if something makes fiscal sense, businesses will choose it for their buildings. We are also seeing utility programs continue to offer incentive programs that companies are taking advantage of to offset costs.

Commercial office buildings have been a hard market for deep energy efficiency

retrofits at least compared to public/institutional buildings. Is this changing?

We have had success in that market, actually. A key for us has been to take a more gradual approach to retrofitting.

EBJ: What's your value proposition in renewable energy and how has that evolved over the last five years? What are you expecting over the next five years?

Gibson: Whether it is food waste, biogas from the wastewater treatment process or reclaiming metals from waste streams, our mission is to recover value from all things. Veolia helps communities and industry ensure energy and water reliability, meet regulatory requirements and safeguard public health, all while protecting our natural resources. We introduce renewable energy sources and alternative fuels into the energy mix where it is viable. Recently, Veolia's solutions prevented 22 million metric tons of global carbon emissions and converted 31 million metric tons of waste into new materials. At the same time, we produced 52 million megawatt hours of energy, provided 96 million people with drinking water and supplied 60 million people with wastewater service. As an example of our recent work in renewables, the Gresham, Oregon City Council partnered with Veolia North America to implement a world-class wastewater program, with the goal of protecting Gresh-

Veolia Energy North America Acquires Enovity

Veolia Energy North America Holdings Inc. announced the acquisition of **Enovity** (San Francisco, Calif.) an energy services firm, in January 2017. Enovity is a strategic acquisition that complements Veolia's **SourceOne** energy services business, providing a platform for expanding the company's geographic footprint in the building energy services sector.

Buildings account for more than 40% of all energy consumption in the United States, and more than 30% of all energy consumed worldwide. Improving energy efficiency in buildings is fundamental for reducing greenhouse gas emissions in cities, decreasing costs and improving productivity for businesses and strengthening energy security; and thus, the circular economy.

The building energy services industry is a fast growing sector, driven by environmental regulation and energy costs, that touches all markets, especially regionally in California. The U.S. building energy efficiency market, a $64 billion industry, plays an ever critical role in controlling energy consumption and CO2 emissions in cities.

Acquiring Enovity supports Veolia's growth strategy within the energy services sector in North America. With the Enovity acquisition, Veolia's energy solutions business expands to 250 professionals with offices in New York, Boston, Philadelphia, and four locations in California (San Francisco, Los Angeles, Irvine and Sacramento); combining the leading minds in the energy services business.

Veolia group is a global leader in optimized resource management. With over 174, 000 employees worldwide, Veolia designs and provides water, waste and energy management solutions that contribute to the sustainable development of communities and industries. Through its three complementary business activities, Veolia helps to develop access to resources, preserve available resources, and to replenish them. In 2015, the Veolia group supplied 100 million people with drinking water and 63 million people with wastewater service, produced 63 million megawatt hours of energy and converted 42.9 million metric tons of waste into new materials and energy. **Veolia Environnement** (listed on Paris Euronext: VIE) recorded consolidated revenue of €25 billion ($27.2 billion) in 2015 and €24.4 billion in 2016.

Veolia Recent Acquisitions

Acquired	Date	Acquired Company Description
Enovity, Inc.	Jan-17	Enovity is an energy services firm based in San Francisco in the building energy services sector. Veolia's energy solutions business expands to 250 professionals with offices in New York, Boston, Philadelphia, San Francisco, Los Angeles, Irvine and Sacramento
Sulfur Products Division, Chemours	Aug-16	Chemours Sulfur Products Division is a specialist in the recovery of sulfuric acid and gases of the refining process, which are regenerated into clean acid and steam used in wide range of industrial activities.
Bioenergia Muvek Energiatermelo Zrt.	Jul-16	Bioenergia Muvek Energiatermelo (DBM) operates a biomass energy plant in Szakoly, Hungary.
Kurion Inc	Feb-16	Kurion is a specialist in nuclear waste cleanup technology and is credited for stabilizing Japan's Fukushima Daiichi nuclear power plant in the wake of the 2011 tsunami. Kurion was founded in 2008, with operations in the United States, the United Kingdom and Japan, employing over 200 people.
Nuon Energie und Service GmbH	Jan-16	Nuon Energie und Service GmbH operates the utilities of two industrial parks in the state of North Rhine-Westphalia in Germany:
Boomeco Limited	Jan-16	Boomeco is a waste wood processor and producer of refuse-derived fuel (RDF) based in the South West of England.
AKG BV	Sep-15	AKG recycles polypropylene plastics from industrial and household waste, from which it makes polypropylene granulates that it sells to manufacturers of plastic products. Polypropylene is used in everything from the lids of Tic Tac boxes to microwave-resistant food containers.

am's infrastructure assets while reaching energy independence.

EBJ: SourceOne does significant business with data centers and financial institutions. What are some unique needs and requirements of these types of clients?

Gibson: Power reliability is extremely important to data centers and financial institutions. If power goes down, service goes down. Even a blip in service can have tremendous financial and business implications. Therefore there is an extreme emphasis placed on quality assurance and quality control – starting from where equipment is manufactured, commissioning it properly when it's installed, and afterwards ensuring it is properly maintained. They particularly need building systems that don't fail, with redundancy to ensure they never lose service. That is one of the many reasons why our core mission is reliability of service.

EBJ: The Clean Power Plan was expected to drive greater investment in energy efficiency and new business for ESCOs as states sought demand-side measures to meet their GHG targets. Did you also see the CPP as representing a significant opportunity? what are you expecting now?

Gibson: Regardless of the Clean Power Plan's status our market assessments indicate that the energy efficiency market will continue to grow.

EBJ: The ESCO model has been mostly successful in the public/institutional space. Do you see that changing?

Gibson: No, the ESCO model is an effective model as it allows municipalities to enhance energy efficiency goals while working within their financial restraints. Today, public and private sector customers alike have more options for financing energy efficiency projects than in years past, such as through utility on-bill financing, and we have seen this contribute to growth in demand for ESCO services.

EBJ: What new building technologies are having the most impacts for improving energy performance and how are you deploying them?

Gibson: Broadly, there is a continued move toward more connected systems. Data analytics is a major area that has created more awareness of day-to-day energy use and has the ability to accelerate deployment of energy efficiency measures.

EBJ: How has the energy efficiency industry changed in the last 2-3 years and how have you adapted?

Gibson: For prescriptive measures: lighting has evolved. But the market is very focused on "the next big thing." In that sense, the biggest change is data. First, with smart meters, more owners have access to granular energy data. California is re-architecting its energy efficiency programs to leverage this data, for instance. Second, in terms of technology, there are a lot of variables and factors for customers to sort through. That's central to our value proposition; we're energy experts, we're operators, we're software experts, so we are able to combine advanced data tools plus engineering know-how. □

Veolia Environnement 2016 Revenue Results by Business

In € millions	Year ended Dec 31, 2015	Year ended Dec 31, 2016	Change	Change @	Change #
Water	11,356	11,138	-1.9%	-1.5%	1.8%
Waste	8,684	8,401	-3.3%	0.5%	1.6%
Energy	4,925	4,851	-1.5%	0.4%	3.2%
Group	**24,965**	**24,390**	**-2.3%**	**-0.4%**	**2.0%**

Source:Veolia press release announcing 2016 results on February 27, 2017.

Notes: Water revenue declined -1.5% at constant exchange rates, and increased +1.8% at constant exchange rates excluding the impact of the Construction activity and energy prices.The decline was explained by a -1.5% decrease in volumes and weak price indexations (+0.2%) and the decrease in Veolia Water Technologies and SADE construction revenue.Waste revenue rose +0.5% at constant exchange rates and +1.6% at constant exchange rates excluding the impact of the decrease in Construction activity from a positive volume impact of +0.6%, and a service price impact of +0.8%, including solid performance in the UK thanks to new contracts and the commissioning of the Leeds incinerator and clear growth in Germany, the result of solid commercial activity, and higher volumes and recycled paper prices of 11%; solid growth in hazardous waste (+2.4% at constant exchange rates); mitigated by a weak Industrial Services performance in the United States and Australia a drop in municipal collection volumes of -10.3% in France. Energy revenue rose from a favorable weather impact in Central Europe (but negative in the United States), and the progression in Energy activities in China, specifically heating networks and industrial contracts. (@: Change at constant exchange rates#: Change at constant exchange rates, excl. impact of Construction activities and energy prices)

Veolia Environnement 2016 Revenue Results by Region

In € millions	2015	2016	Change	Change @	Change #
France	5,472	5,418	-1.0%	-1.0%	-0.9%
Europe excluding France	8,575	8,286	-3.4%	0.1%	2.3%
Rest of the World	5,926	6,028	1.7%	3.7%	5.0%
Global Businesses*	4,881	4,626	-5.2%	-4.1%	3.0%
Other	112	32			
Group revenue	**24,965**	**24,390**	**-2.3%**	**-0.4%**	**2.0%**

Source:Veolia press release announcing 2016 results on February 27, 2017

**Global businesses include Hazardous waste activities, and Solutions and Technologies activities in Water (sensitive to fluctuations in construction contracts); In North America, revenue rose +0.6% at constant exchange rates. Following a first half decline of -9.4% at constant exchange rates, penalized by a drop in gas prices in Energy, fall in heating volumes sold (due to a very mild winter), and a downturn in industrial services, there was a major upturn in revenue in the 2nd half with growth of +12.0% at constant exchange rates.This revenue momentum is primarily due to the integration of the Chemours Sulfur Products division's assets.*

THE TRUMP ADMINISTRATION: TRUMP: FOUR EMERGING SCENARIOS TO 2020

View from EBJ's Man in Washington Andy Paterson, Markets & Policy Editor

With first 100 days into the Trump Administration behind us, four scenarios are emerging. None is clearly dominant, and they each surge more or less into play, depending on the week and the domestic and international agenda drivers.

A) "Hard Right Rudder" is exemplified by the attempt to repeal the Affordable Care Act, big reductions in corporate tax rates, and rollback of regulations. The "repeal two-for-one regulation" emanates from this political philosophy.

B) "Art of the Deal" may be at work in negotiation on an eventual Infrastructure bill, important to members of Congress from both parties and to Governors of all stripes. Many tradeoffs will need to be made as priorities are fought over.

C) "Senate Regency" is evidenced by the moderated Omnibus Budget agreement to avoid government shutdown in early May. Cooler heads among Senate Leadership working with Speaker Ryan were able to prevent a shutdown and accommodate enough votes to get a 1,600 budget deal digested. Anger on both the Far Left (too many cuts) and the Hard Right (not enough cuts) offers a positive barometer.

D) "Misfire and Confusion" is shown by Republican infighting over terms related to the ACA. Lack of an Infrastructure bill in the first few months

Strong interlinkage of big issues is shifting what Congress can do. Republicans needed to rollback Health Care to remove the subsidies for insurance premiums and gain $800 billion in budget scoring (over ten years) to then apply to tax reform in the budget scoring derby – and then they need tax reform to provide financing incentives for a mega-Infrastructure bill. Trump has advocated a border tax on imports pegged at another $800 billion on the ledger. Both would enable more corporate rate reduction for small business, but retailers and industry are cool on the border tax which could disrupt trade. Republicans are not united. Trump proposed a $54 billion plus up in Defense spending, but without entitlement reform, the dollars come out of already whittled discretionary spending at agencies like DOE, DOT, Ag, and NIH. He got $15 billion in for DOD in the FY17 Omnibus Budget deal in early May, after giving in to demands by Democrats to fend off deeper budget cuts.

Scenario A) "Hard-Right Rudder"

Under this scenario, Republicans cut corporate and business taxes based on spending reductions at government agencies. Tea Party members would slash agency budgets.

A hallmark of this lurch toward the Right lies in extensive rollbacks by EPA on regulations, starting with the Clean Power Plan and Waters of the US (WOTUS). On April 28, the DC District Court officially postponed its much awaited ruling on CPP from the high profile "En Banc" hearing in late September 2016. EPA would need to re-enter an extended rule-making process over several months to formally withdraw the rule. When CPP was issued originally, EPA received over four million comments, which needed to be addressed before promulgation of the final rule.

At a high level, the seating of Justice Gorsuch in April, a clear Conservative akin to Scalia who he replaced, would seem to buttress rollbacks in regulation – the 5-4 majority, led by Chief Justice Roberts that suspended CPP in Feb 2016 with Justice Scalia, is now restored. The stay has not been lifted.

WOTUS was never popular in Farm states with either party, so the Administration likely will face less static on repealing that law, though the Clean Water Act and TSCA reform remain in effect.

A major area of contention with pro-business groups here is the trashing of multi-lateral trade deals by Trump. Crossover industrial union "hardhat households" are with Trump on his point: America is short-changed on trade deals, leading to outsourcing of a lot of factory jobs since NAFTA in 1993. That trend accounts for much of the vote switching in the Rustbelt (WI, MI, OH, IN, PA, WV); those hardhat households not only lost their jobs (temporary), the factory closed down (permanent loss for an entire community).

Possible Results: Less government spending. Widespread rollbacks of environmental regulations. Could put the House at risk for the GOP in 2018 if a recession occurs. Some progress on national debt, but fewer jobs unfold in Rustbelt states. However, entitlement reform remains elusive as votes from some Democrats are needed. Would the rollback in regulations allow more commercial and manufacturing projects to proceed to financing and investment with historically low interest rates? Too soon to tell; investment would ride on larger perceptions about the health of the economy.

Scenario B) "Art of the Deal… "

In the forced agreement on the Omnibus May 1, Team Trump had to reassert some of the items they garnered "in negotiation", like $15 billion more for DOD, but the Hard Right groups saw the deal as capitulation to avoid a government shutdown.

"Art of the Deal" inherits the rhetoric from trashing multi-lateral trade initiatives (Hard Right Rudder), and recrafts bilateral deals, e.g., with Canada and Mexico. So, Art of the Deal is about delivering results beyond tearing down policy. Trump's support among Independent voters and crossovers is not ideological – he only earns their support with factories being rebuilt, and with training upgrades. Tearing down trade deals does not put food on the table.

Possible Results: Trump positioned as a deal-making negotiator. Uncertainty over whether any House Democrats are susceptible to negotiation.

Infrastructure bill could stimulate some economic growth if coupled with tax reform, possibly energy investment and reduced regulations. Some Rustbelt recovery.

A strengthened NATO with better budget and troop support for EU allies (?)

Scenario C) "Senate Regency"

The Senate has already demonstrated its primary position in shepherding a young government by managing the approval of Trump's Cabinet, many of them contentious. Labor nominee Puzder was a casualty, but was quickly replaced. So far, the Senate is working well the National Security team: DOD Secretary General Mattis, Secretary of State Tillerson from industry, and CIA Director Mike Pompeo from the House. In addition, pacing in the Senate will determine how quickly Trump can get subordinate positions filled in agencies.

When Team Trump descended on Capitol Hill to twist arms on the ACA repeal, they got stiff-armed by Committee chairs and caucus members who reminded them that Article One of the Constitution is the Congress, not the President. The Senate was established to provide a longer horizon decision-making body and many Republican members have not been shy at all about challenging initiatives by Trump on national security (Russian relations), foreign policy (trade) and on intelligence reviews.

Possible Results: Government spending is determined by Senate Appropriators and compromises with House. Tax Reform is critical to any kind of spending deal. Under this scenario, Team Trump would be involved in negotiating tax measures, but Congress is in the driver's seat. Speaker Ryan is steeped in tax law, but the close majority in the Senate is likely the ultimate gatekeeping function with Trump's signature expected to enact potentially the biggest reform since the landmark 1986 deal.

D) Mis-Fire and Confusion

Trump's tweets and misstatements by Press Secretary Spicer display confusion on policy poorly thought out. The attempted Muslim bans on immigration and air travel were knee jerk sops to campaign constituencies, and were interdicted by lower courts. Trump has not yet articulated a coherent foreign policy relative to conflict in the Middle East, Europe, and Asia. Weekend dining with PM Abe (Japan) and then President Xi Jinping (China) are useful for communication, but do not amount to a comprehensive foreign policy with clear goals. A brief business lunch with Chancellor Merkel was clearly frosty. A walk back in favor of NATO after meeting with Scretary General Stoltenberg was welcomed, but follow through with allies at the NATO summit May 25 and at G7 are needed to show substance.

If a much needed Infrastructure bill is derailed over "how to pay for it", then Trump loses a major plank of his campaign and lots of working class jobs go wanting. The Trump coalition needs welders, drillers, truck drivers and miners to be re-employed.

Possible Results: Warring factions among Republicans, results in more lost House seats at midterms in 2018. Losses in the House further jeopardize what Republicans can get done in 2019-20, despite holding the Senate. A fail on an Infrastructure bill could be lethal to keeping the House in 2018. □

Andy Paterson was an original member of the EBJ Editorial Advisory Board in 1988. He lives in Virginia and can be reached, consulted or heckled at adpaterson@gamil.com

Trump Administration: Four Emerging Scenarios

	Trump as Moderate Negotiator	*Trump as Autocrat; Republican Agenda*
Led by Trump from White House	**A) "ART OF THE DEAL… "** · Focus on Terrorism / Crime · Tax reform with some moderation · Health Care Reform by revision · CPP Rolled back / COP Observer ("stay") · Triangulation with Mod Dems · Some Infrastructure $ for Cities	**B) "HARD-RIGHT RUDDER"** · Harsh anti-immigration measures · Epic Tax Reform; big cuts in rates · ObamaCare repealed. Replaced. · CPP canned; "Fossil First" policy · USA withdraws from UN COP · DOD spending boosted, more ships
Led by Congress	**C) "SENATE REGENCY"** · Senate moderates budget cuts. · Tax bill takes time. EPA clipped. · DOD budget up at modest pace. · American Energy Independence bill · Mega-Infrastructure bill, Projects · Comprehensive Immigration deal · Bilateral trade deals; USA stays in COP	**D) MIS-FIRE and CONFUSION** · Fights on tax/budget cuts in Senate · Funding for Border Wall not agreed · CPP litigation creates confusion · ObamaCare rollback is a debacle · Infrastructure bill weakened by TeaParty · China uses pressure via T-bond financing · Trade policy descends into chaos

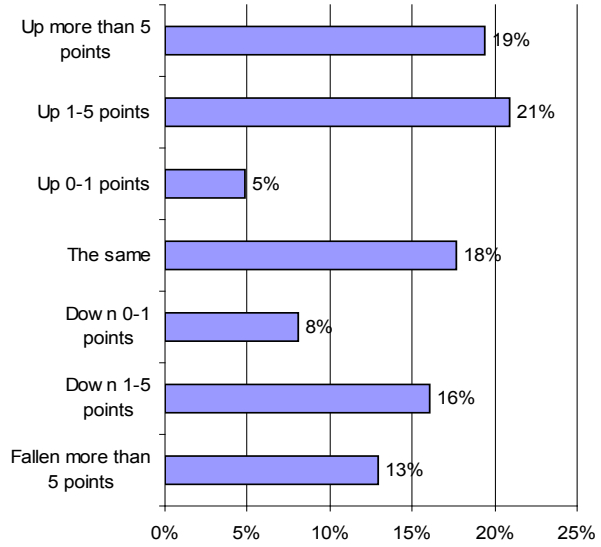
Source: EBI Inc., Andrew Paterson: Environmental Industry Summit 2017 presentation

Ranking of Environmental Markets by Service

	2016 Rank	2017 Rank
Project mgmt./Construction mgmt.	7	1
Design and project engineering	12	2
Outsourcing EHS functions	4	3
IT/EMIS software/systems/training	2	4
Operations & maintenance	11	5
Industrial waste mgmt/in-plant services	14	6
Private remediation/redev/brownfields	16	7
Water recycling/reuse	1	8
Monitoring & analytical work	9	9
Investigations/assessments/audits	13	10
Energy: Performance contracting	10	11
Permitting/compliance	6	12
Waste minimization	15	13
Green building design/construction	3	14
Solid waste diversion/recycling	17	15
Smart growth/"green" planning	5	16
Gov't remediation/ base close/conversion	18	17
Ecological restoration	8	18

Source: Environmental Business Journal annual EBJ Snapshot Surveys;"prospects for growth in the next two years"

Change in Operating Margin from 2015 to 2016



Source: EBJ 2017 Snapshot Survey: Question was: How did your operating margin fare in 2016 compared to 2015? Median response was 'The Same'; Mean was +0.1 points; See selected reasons for margin change among respondents on page 23.

Operating Margin Change 2014-2016

	2016	2015	2014
Up	45%	48%	68%
Same	18%	20%	15%
Down	37%	32%	17%

Source: EBJ 2017, 2016 and 2015 EBJ Snapshot Surveys; Note: Margins in 2013 were down with sequestration so 2014 is more a function of a bad 2013 than a good 2014.

Next key invention, break-through technology or disruptive service that will dramatically impact how the environmental industry does its business

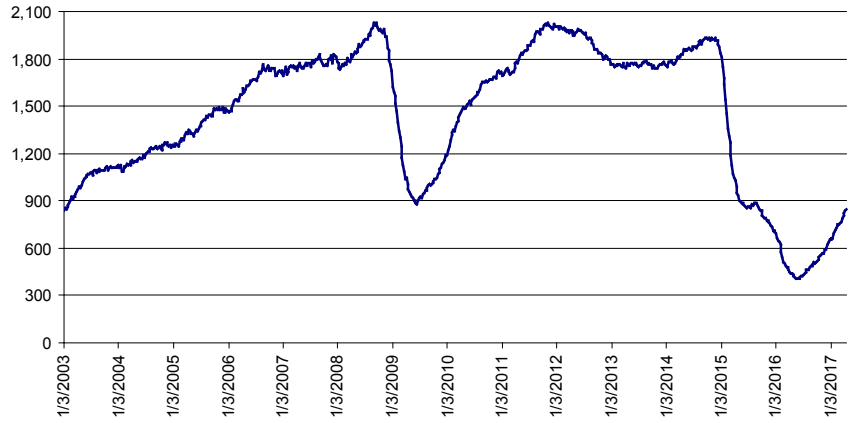
- AI; AI management systesms; AI programs will start writing many of the reports prepared by humans; Using artificial intelligence to do more and more of what humans currently do, coupled with increased use of drones
- Big data analysis across thousands of sites
- Broad proliferation of microgrids
- Clean coal
- Climate change if it leads to major disruptive events impacting life as we currently know it and its impact on primarily our metro urban sea-coast communities.
- Data management/availability
- Deregulation; Reduction of federal EPA, More regulations at the state level with less funding; Regulatory changes
- Development of clean energy sources
- Drones and their application for environmental field surveying.
- Environmental assays done remotely with limited qualitative field testing and analytics diminishing the means for physical laboratories.
- Fast increase in availability of affordable all electric, autonomous, self driving, long driving range, autos will greatly reduce environmental pollution and increase safety by 2030.
- Information management; Information/data management for water reuse; Integrated information management
- Micro wireless analyzers
- Nano-technology has the potential for being a game changer for our industry in terms of how various waste streams are neutralized
- Remediation of more complex pollutants safely
- Remote sensing; Sensor development and performance monitoring
- Small scale and mobile water treatment, particularly desalination applications, provides tremendous opportunity for both drinking/municipal, as well as O&G and industrial treatment applications.
- Trump administration on climate change will be disruptive.
- Water filtration: Produced water becoming potable.
- Weakening of federal regulations and enforcement and less funding support for renewable energy project may negatively impact the industry.

Source: Environmental Business Journal 2017 Market Snapshot & Industry Trend Survey. Question was;What do you think is the next key invention, break-through technology or disruptive service that will dramatically impact how the environmental industry does its business?

EBJ 2017 Survey: Reasons for Margin Changes in 2016

- Challenging performance-based projects.
- Loss of work due to reduced monitoring requirements
- Increased transportation and disposal expense
- Project delays by owners
- Slow down in environmental remediation business
- Delays in major projects starting
- Decreased utilization (fewer billable hours), in part due to increased marketing and BD efforts. We are going to be more selective about which projects/ clients to pursue.
- Graduated the 8a Program in 2014 and LPTA dominated Federal Market.
- Health Care costs continue to rise
- Overhead investment based on size/ growth of company.
- A merger.
- Midstream market finally declined in response to oil price declines in previous years.
- Tighter margins on private bids
- Reduction on markup on subcontractors by the public clients
- Fewer remediation projects awarded, had to reduce overhead
- Added sales personnel
- Spent more time on proposals and less time on billable work.
- Invested in a new service area (strategic hire) that has yet to generate profits.
- Consolidating efforts and focusing on core areas
- Reorganization of the business.
- New management model.
- Gross revenue increase of 13%, costs minimally reduced.
- Revenue outpacing expenses given our size and current growth rate.
- Improved operations and strong US infrastructure business
- Adjusted our MBD focus, acted more strategically and pursued higher ROI opportunities.
- Streamlined operations, improved management of fixed price projects

Weekly U.S. Rotary Rig Count Rig Count 2003-2017

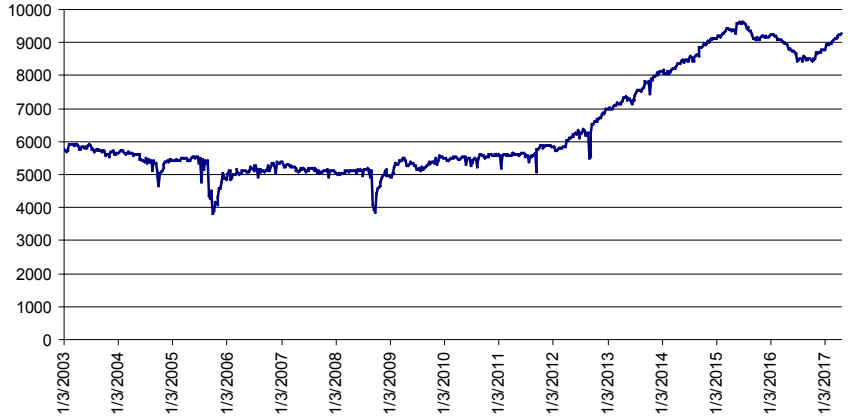


Source: Baker Hughes Rig Count weekly data;The Baker Hughes Rotary Rig Count is a weekly census of the number of drilling rigs actively exploring for or developing oil or natural gas in the United States.

Weekly Brent Crude Oil Price 2003-2017

Source: U.S. Energy Information Administration Weekly Europe Brent Spot Price FOB (Dollars per Barrel)

Weekly U.S. Field Production of Crude Oil 2003-2017



Source: U.S. Energy Information Administration (Thousand Barrels per Day)

SLR SEES GROWTH IN INFRASTRUCTURE AND SOME STABILIZATION IN OIL & GAS

***SLR Management Ltd.**, a privately held corporation 100% owned by U.K.-based **SLR Holdings Ltd.**, is an international environmental consultancy employing approximately 1,200 people at 10 principal operating companies in Europe, North America, Africa, and the Asia-Pacific region. It provides environmental consulting engineering services across several industry sectors, including infrastructure, the built environment, and the extractive industries. The company generated about $45 million in revenue during its 2015 fiscal year. **SLR International Corp.** (Bothell, WA), which was founded in July 2000, is the operating company responsible for the SLR's U.S. business and is overseen by Kevin Rattue, an executive director of SLR Management Ltd. Mr. Rattue recently responded to some EBJ questions about the company's operations and the current state of the business.*

EBJ: Please describe SLR as it exists today, in terms of its global structure and operations. How would you describe its value proposition, and how do you differentiate the firm from a pretty crowded field?

Kevin Rattue: SLR provides global environmental and advisory solutions from a network of offices in Europe, North America, Asia-Pacific, and Africa with a head count of approximately 1200 people. SLR International is SLR's operating company in the United States and represents approximately 26% of the business by revenue. SLR provides advice and support on a wide range of strategic and site-specific environmental issues to a diverse and growing base of business, regulatory and governmental clients.

We specialize in serving clients in the oil and gas, mining and minerals, infrastructure, built environment, industry, and power sectors. When many of our true competitors are silo'd by their operating structure or ownership model, we believe our strong "one team" culture and collaborative approach are key to our growth and success. Similarly, we believe SLR's global focus on providing environmental and advisory services rather than being a small part of an essentially engineering consultancy differentiates us.

EBJ: Following up the first question, please estimate how much of the SLR business is derived from different geographic regions (North America, U.K./ Ireland, Australia, Africa, etc.) and different practice areas (infrastructure, energy, waste management, planning/development, etc.).

KR.: In 2015 (the last year for which figures are available), our revenue by region was Europe 33%, US 26%, Canada 19%, Asia Pacific 16%, and Africa 6%. By sector the split was oil and gas 30%, built environment 17%, mining and minerals 17%, infrastructure 15%, industry 13%, and power 8%. We will report growth for 2016, but with a similar regional and sectoral split; FY16 accounts and trading data will be available in March 2017.

EBJ: What's your balance of clientele among federal, state/municipal, and the private sector, and which private sector industries are best represented among that clientele? Are you seeing any shifts in the balance of business between the federal, state/local, and private sector categories, and if so, what's driving those shifts?

K.R.: SLR has a balanced clientele, but the majority of its work is with the private sector. This spans our business in oil and gas, mining and minerals, industry and power. The majority of our federal work is captured outside the United States under our infrastructure and built environment sectors through state and federal contracts, although increasingly our direct client may well be a private-sector operator managing the delivery of programs on behalf of the government through a public-private partnership. This is an increasing trend in the infrastructure sector. The waste subsector would be a good example of this.

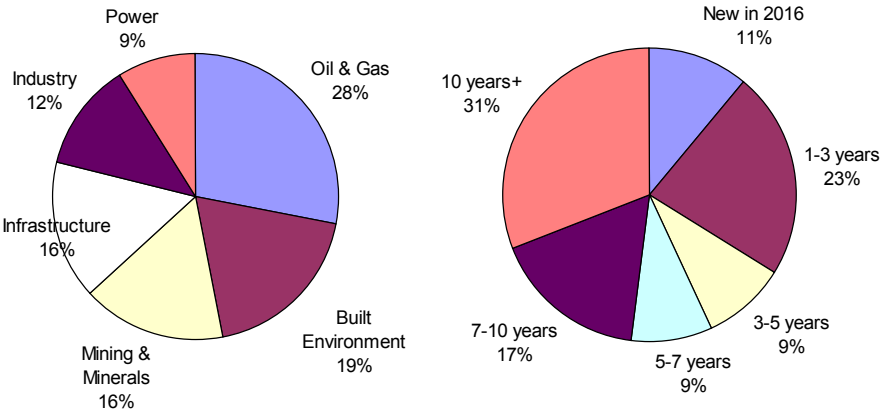
EBJ: What key client sectors are driving growth? Any recent examples of new drivers in your markets?

K.R.: SLR continues to see expanding opportunities in the industrial and power sectors as we work to assist clients in responding to evolving climate and health and safety drivers that impact global operations. Pressure on either aged or insufficient housing or infrastructure in many regions is also driving growth opportunities.

Despite the subdued market conditions in the oil and gas and mining sectors, we continue to see opportunities supporting clients with ongoing regulatory compliance, closure, transaction, and dispute resolution issues. There are some indications that market conditions in oil and gas and mining have stabilized, and more investment is taking place.

EBJ: Please describe some of the recent highlights in your business, in terms of business achievements, major projects, contracts, acquisitions, leadership/direction changes (if any), etc.

SLR Revenues by Client and by Length of Client Relationship



Source: SLR annual report

K.R.: SLR won the International Business Excellence Award at the Environmental Analyst's Business Excellence Awards event in September 2016. In the United Kingdom, SLR also received a number of awards for the built environment sector, including "Best Global Environmental Advisory 2017." This award comes from BUILD, and is part of their 2017 Home Builder Awards.

In SLR's built environment sector, SLR Consulting (Canada) Ltd. was awarded a contract with Public Works and Government Services Canada for providing environmental site characterization services in British Columbia and the Yukon. In Africa, SLR worked on one of the South African government's Strategic Integrated Projects, adopted in the 2012 National Infrastructure Plan, with the aim of transforming the economic landscape while simultaneously creating significant numbers of new jobs. SLR's South Africa staff has been involved in this project since 2005.

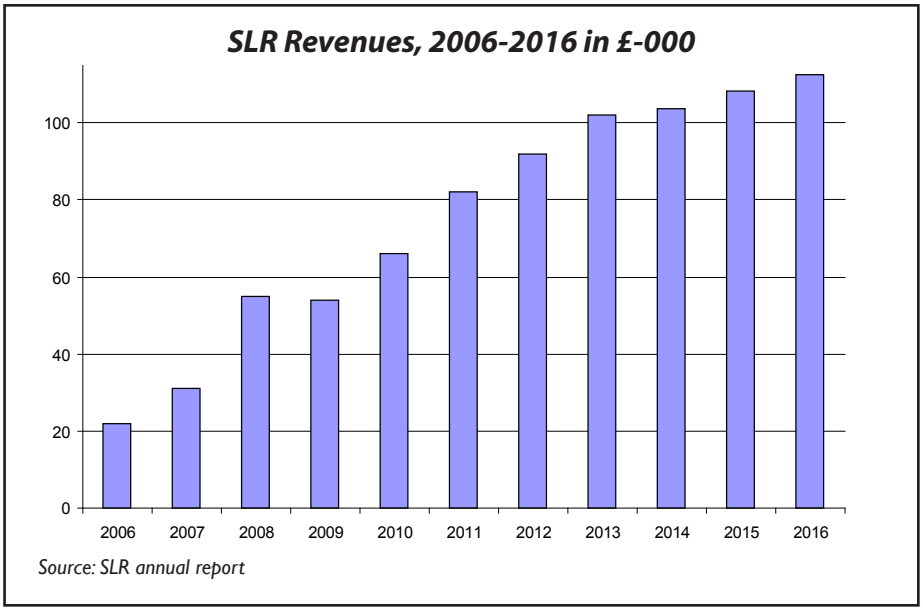
SLR has continued to strengthen and reinforce operational leadership across the business in support of planned growth. Recent appointments have included Rick Smith as North American COO, Paul Gardiner as APAC regional manager, and various other strategic appointments relating to sector growth initiatives.

EBJ: If SLR has made any acquisitions over the past few years, please describe the businesses acquired, the strategic goals achieved through acquiring them, and the success to date of those transactions.

K.R.: Key acquisitions in the last three years included senior strategic level advisors in acoustics, noise and vibration, mine water and waste management, marine sciences, and mergers and acquisitions.

In 2014, SLR acquired a number of companies: In the United Kingdom, SLR acquired Challenge Energy Ltd. (CEL), a company focused on strategic management advice, particularly in the oil and gas sector. In the United States, SLR acquired HFP Acoustical Consultants, with offices in Calgary, Alberta, and Houston, Texas. HFP provided acoustics and noise control consulting services.

Haas Consulting in Alaska was also acquired, providing SLR with a new lead in compliance and environmental management systems to the oil and gas market. And in Africa, CCA Environmental (Pty) Limited was acquired, bringing their strength in EIS and permitting consultancy projects, focused primarily on oil and gas and infrastructure.



In 2015, E.Vironment LLC (EV) was acquired in Houston, Texas. With a team of five senior advisory principals and a panel of 40 specialist independents, EV provides environmental, health and safety, and process safety services, primarily for clients on asset transactions or through corporate management improvement programs.

EBJ: Are you building or designing climate adaptation and weather resilience into your clients' assets? Which clients would you say are most interested or advanced on this front?

K.R.: SLR has continued to add to its capability to provide advice on low-carbon and energy management strategies. Improved energy management helps our clients achieve significant cost savings and clear regulatory requirements linked to industrial emissions and climate change targets. This offering can also pull through other environmental and engineering solutions that give clients a complete strategy to operations service.

In addition to environmental and energy projects, SLR's advisory capability has seen the firm advise on a number of integrated strategic environmental health and safety (EHS) management projects and merger and acquisition opportunities. Clients in both the oil and gas and industry sectors seem the most interested in these capabilities.

Broader environmental services are provided to clients across all of our sectors that address climate adaption and resilience advice. This can include, for example, flood risk and water resilience services. □

Growth in revenue and profit in 2016 for SLR

In April 2017 SLR released its financial accounts and annual report for 2016, showing another year of progress with revenue up 3.5% to £112.6 million and profit (as measured by earnings before interest, tax, depreciation and amortisation) up 17.5% to £13.3 million. Commenting on the year SLR's CEO Neil Penhall said "In a year which saw further political change, economic uncertainty and ongoing market volatility, I am pleased to report that SLR delivered ongoing growth in revenue and profitability... Our strong 'one team' culture and collaborative approach... enabled us to continue to drive forward various strategic priorities, including health and safety, staff development and system and information sharing initiatives."

ICF: PRESIDENT TRUMP WILL HAVE LIMITED ABILITY TO RESHAPE ENERGY MARKETS

As a surprised nation and the corridors of power in Washington DC were still adjusting to the election of Donald J. Trump as 45th U.S. president, **ICF** experts in energy and electricity markets and environmental regulations that affect the energy sectors discussed the range of outcomes likely for oil, gas, coal and renewables in a December 2016 webinar. Their remarks are summarized and exerpted here in text reviewed by ICF prior to publication in EBJ sister publication CCBJ.

INTRODUCTION: Judah Rose, SVP and Managing Director

President Trump is very focused on the energy sector, with a particular emphasis on developing infrastructure to get oil, coal, and gas to markets, including export markets, and on decreasing environmental regulations. However, the president will face significant constraints in his efforts to increase production of coal, oil, and gas. First and foremost, the supply and demand fundamentals that exist in the energy industries today are key constraints.

In terms of legislation, we don't foresee significant changes to the Clean Air Act, which has only been amended twice in its 46-year history, the last time in 1990. Also, a great deal of energy policies are controlled at the state level. He will have the most flexibility in taking administrative actions, although there are constraints on these powers as well.

Trump's trade and tax policies could have a range of positive and negative impacts on fossil fuel production and demand, most of which are discussed in more detail by my colleagues below.

There's obviously a lot of uncertainty about what policies will be proposed or pursued and how they'll be implemented. In this discussion, we focus on the most likely outcomes, the cases or scenarios that we see. We are not expressing an opinion about what 'should' or 'shouldn't' happen.

Chris MacCracken, Principal, On Environmental Regulation

Trump has said that some environmental regulations, especially the Clean Power Plan to reduce electricity sector greenhouse gases (GHGs), can threaten jobs and impede economic growth. While there are a number of regulatory actions his team could take to dismantle these regulations, the Clean Air Act has survived for a very long time, so we expect most actions to be done within the context of Clean Air Act, not for the act itself to be changed.

As shown in the Clean Air Act Rules chart, there's a wide range of regulations that might be reviewed, starting with the Clean Power Plan and going all the way through the EPA's original Endangerment Finding on GHGs. These are all in different stages of the regulatory lifecycle, so depending on where they sit, the administration will have to use different approaches.

The Clean Power Plan is at one extreme, as it is still in the hands of the courts. The new administration therefore has options on how to address the rule, should it not want the rule to move forward. The Regional Haze regulation is in a different part of its lifecycle. It is a final rule that has been used in several cases by EPA. However, it is exercised on a case by case basis, with each case going through its own regulatory proceeding, so the new administration could still impact the implementation of the rule through its enforcement approach rather than by seeking to rewrite it.

Without the Clean Power Plan, we expect most action around GHGs to move toward the states. California will proceed with its program and the RGGI states will proceed with theirs. The big question is whether other states will join these programs or start their own individual programs. We might also see more states undertaking their own actions around conventional pollutants.

At the individual coal power unit level, we may have a situation where changes in the rules or their enforcement result in lower-than-expected expenditures for compliance going forward, either on capex for new pollution controls or on O&M for existing controls. This may result in some coal units being able to survive longer than they would have otherwise.

Michael Sloan, Principal, on Natural Gas Markets

The Trump Administration has made it clear it considers natural gas and oil development to be major priorities. At this point we're looking at two major areas of fundamental change in federal policy: getting government 'out of the way,' so to speak, of the oil and gas producers and midstream players, and making additional resources available for development on federal lands and waters.

Regardless of changes in federal policy, natural gas will continue to be a fundamental driver of U.S. economic growth, activity and value during the Trump administration. ICF projects U.S. natural gas production to increase 25% by 2020, and more than 30% by 2025, with prices rebounding to $3.50 and $4.00 per MMBTU, and oil prices similarly rebounding. As a result, the Trump Administration will be able to meet many of its objectives for natural gas and oil without major changes in policy.

The administration promises to streamline permitting processes for all energy projects, and the most immediate focus will likely be on big oil pipelines, including the Keystone and Dakota Access Pipeline (DAPL), where they can change policy without time-consuming administrative processes.

However, on the natural gas side, there aren't any similar big wins. The administration will certainly be more willing to approve LNG export facilities and more supportive of natural gas pipeline projects, but most of those projects are being driven by economics and are being slowed by state and local opposition. So federal intervention or policy changes are unlikely to have significant impacts.

The new administration will change the makeup of FERC, with three new Republican commissioners, and we would expect

the new FERC majority to be more supportive of natural gas pipeline infrastructure projects. However, while FERC oversight can be burdensome and expensive, it has not been the major roadblock to disputed natural gas projects. Most of those roadblocks have been at the state and local level. We do expect FERC to be more willing to exercise federal pre-emption of state law, however, the extent of FERC's authority to overrule state and local governments remains somewhat ambiguous and will certainly lead to court challenges.

Regulation of oil and gas development and production primarily falls at the state level, so changes at the federal level will have relatively modest impacts. While the risk of additional hydraulic fracking regulations on federal lands will decline, most hydraulic fracking activity is on private lands. The environmental issues associated with oil and gas production aren't going to go away and we will continue to see opposition to oil and gas development at the congressional, state, and local levels. Rollbacks or delays in implementing federal environmental regulations affecting oil and gas production will reduce costs and burdens on producers, but the impacts on markets and consumption will be relatively small.

OFFSHORE OIL DEVELOPMENT WILL FACE OPPOSITION

We do expect the Trump Administration to take action to open onshore and offshore federal lands to leasing, but political and legal challenges will likely delay implementation. Development on the offshore East Coast in particular will be politically challenging due to regional opposition. We expect significant interest from the industry in Arctic regions, but we still consider the economics of production in these regions to be uncertain. Overall, we expect improved access to federal lands to have impacts at the local levels but only modest impacts on energy markets at the national level.

The Trump administration's focus on corporate tax policy and international trade will also be areas that impact the natural gas markets and energy investments. New corporate tax policies aimed at promoting new domestic investments and demand are likely to spur additional investments. Restructuring of the corporate tax rate from 35% to 15% would reduce costs for both producers and consumers, stimulating production and demand. While tax policy is very complex, our initial analysis suggest that the costs for a typical natural gas production well would be reduced by about 10 cents per MMBTU, leading primarily to lower prices rather than higher profitability.

We also expect tax incentives for investment in major infrastructure projects to stimulate some additional demand for natural gas. There are several avenues for tax incentives to induce additional natural gas demand: from Alaska LNG exports, which would likely require economic incentives and a streamlined environmental permitting; or incentives to foster the development of a petrochemical industry in the Northeast to use cheap gas from the Marcellus and Utica shales to create high-value jobs in these areas.

The bigger area of potential growth is from trade policy. U.S. gas exports are already a key factor driving the gas market. ICF is projecting significant growth in demand for U.S. LNG exports and pipeline exports to Mexico.

However, the international LNG market is currently highly competitive. Within the time frame of the Trump administration, ICF does not expect the LNG export facilities currently under development to be fully utilized due to international competition. Incentives that promote new gas or LNG infrastructure won't have a significant impact in this area of the market.

With a new approach to trade policies, we may see bilateral negotiations lead to new LNG export destinations and further contracting. The risk is that doing so will further flood international markets, driving down the value of LNG exports across the board. (One interpretation of the nomination of Rex Tillerson from ExxonMobil as Secretary of State is that it is consistent with his emphasis on promoting gas and other energy exports. He is arguably the person best positioned to champion natural gas exports, according to Sloan.)

PRO-GAS POLICIES COULD HAVE ANTI-COAL EFFECTS

It's important to note that most of the policies that would benefit natural gas will limit the ability of coal to come in and regain market share. In order to have a win-win for coal and gas, the administration will need to drive natural gas demand significantly higher than we're projecting, and we think that will be difficult to do.

There's also an unlikely lose-lose scenario in which a significant trade war limits exports of natural gas. Growth in Mexican exports could be inhibited due to protec-

Clean Air Act Rules

- **New administration has a number of matters to review**
  - Clean Power Plan–111(d)
  - New Source Performance Standards–111(b)
  - Paris Agreement
  - New Source Review/ Prevention of Significant Deterioration (NSR/PSD)
  - Cross-State Air Pollution Rule (CSAPR)
  - Regional Haze
  - NAAQS for ozone and particulates
  - Mercury and Air Toxics Standards (MATS)
  - Social Cost of Carbon
  - Endangerment Finding
- **Approaches to dismantling or softening the blow of these will vary depending on their form (final rule, guidance, in litigation, etc.)**
- **Some better suited to administration action than others**
  - Legal challenges by NGOs and other stakeholders likely for most actions

Source: ICF

tionist trade policies, in particular any efforts that would slow Mexican economic growth and reduce Mexican natural gas demand, while international trade disputes could limit the growth of LNG exports or access to new markets. This scenario would lead to lower natural gas prices which would benefit consumers, but lead to a slowdown in the natural gas industry and make it even more difficult to rebuild the coal industry.

Judah Rose On The Future Of Coal Under Trump

U.S. coal demand is down about one-third since 2008. And since 2009, about 15% of the coal power capacity has been retired due to a combination of gas prices and environmental regulations; lower utilization has resulted in an additional 15-20% decrease in coal power generation.

President-elect Trump has indicated that he wants to increase coal production and bring back the coal jobs, but his options for accomplishing those goals are limited. He can more easily stop further erosion in coal production than return coal production to the levels of the mid-2000s. Stopping or greatly delaying the Clean Power Plan will help prevent additional reduction of coal usage, as will other EPA and FERC regulatory changes. However, coal still faces challenges from low natural gas prices and sluggish demand for power. Nearly all coal is used to produce electricity, and competition between gas and coal in this industry is fierce.

From our perspective, the most likely scenario is that coal will hold its current position, down from where it was, but won't see significant additional declines under the Trump Administration. Even without the Clean Power Plan, we don't think the economics support construction of new coal plants. We're not optimistic about a large win/win for gas and coal in which gas prices go up enough so that pressure on the existing coal power plant fleet is greatly alleviated and there's a large recovery in coal power generation, although there may be regional impacts of this nature. As discussed in the gas section, we are watching carefully developments related to LNG exports.

Part of the picture here is that the growth in electricity demand has been very low by historical standards, especially in the industrial sector, where demand actually declined slightly from 2000 through 2015.

If the industrial sector starts to grow more significantly, that could help electricity demand growth recover. (The emphasis on automotive production and manufacturing in the U.S. is part of an unprecedented effort to revive manufacturing activity, according to Rose.) Stronger economic performance could also translate into greater household formation, which would affect residential consumption.

The other factors driving down growth in electrical consumption—including federal efficiency standards for appliances, state energy efficiency policies, and increased competition from distributed energy, especially solar—don't provide much of a target for the Trump Administration if it looks to increase electricity demand in hopes that this would percolate down to growth in coal demand.

The major opportunity for increasing coal production is through exports. The U.S. is the fourth largest coal exporter and a substantial competitor in the international coal space. The locus of the accessible market for coal is the Pacific Basin, where China already consumes seven times as much coal as we do and is expected to increase its consumption to 10 times as much. But the North American coal infrastructure is geared to getting coal to Europe, not the Pacific Basin. So there's an infrastructure gap there.

Trump has identified development of Pacific Coast ports for increased coal exports as a priority. But there's only one active proposal that's in play while several have been canceled. There is state opposition. So it's not clear how successful he'll be and how much coal export capacity there could be developed for Pacific Basin markets.

Import tariffs on coal could help U.S. coal producers, but they could also reduce exports through trade disputes. On the other hand, a significant tariff on steel imports would probably lead to more metallurgical coal demand from domestic steelmakers.

(The nomination of Wilbur Ross as Secretary of Commerce, an investor in the steel industry, may also signal an upside for metallurgical coal. In 1980, U.S. production of metallurgical coal was 70 million tons per year versus approximately 20 million tons in 2016, according to Rose.)

There are things on the edges that would help the industry such as permits for expanding existing mines, including relatively small adjustments that have not been supported by regulators in the recent past. That can change and will help to reduce coal costs and increase or at least maintain supply.

Carol Babb, Vice President, On Renewable Energy Markets and Bipartisan Support for the PTC

Renewable energy doesn't appear to be one of President-elect Trump's top five priorities, although he has talked about the importance of energy independence and renewables contribute to that. When we look at the market drivers for wind and solar in particular—which grew to supply 5.6% of power generation in 2015—we see the Trump Administration having little, if any, negative impact through the early 2020s.

While changes are possible, it doesn't seem likely that the federal investment tax credit—currently at 30% and slated to begin declining in 2020, ultimately down to 10% in 2022 and thereafter—will be reduced or rescinded. Notably, its extension was tied to allowing U.S. oil exports.

The production tax credit for wind power projects enjoys bipartisan support, especially in several Midwestern states that have benefited from it. It is scheduled to expire by the end of 2019, although projects that begin construction may still receive the credit as long as they come online by the end of 2023. It's unlikely to be rescinded before then.

What may be subject to change is the IRS's requirements for renewable energy projects to qualify for the ITC. This was changed in 2015 to 'start of construction,' which was significant as far as projects

qualifying for the credit. If this is revised back to 'put in service,' this could certainly impact some solar projects.

Other things to keep in mind are the pricing trends for PV modules and wind turbines and the fact that renewable portfolio standards and net metering policies are set by the states. In pricing, the costs in dollars-per-megawatt continue to go down, which reduces the importance of the ITC for solar projects in particular. There's an oversupply of PV modules globally, which is keeping costs down. We project dollar-per-megawatt capital costs to go down by as much as 30% by 2023 for PV solar projects.

Twenty-nine states, plus the District of Columbia, currently have some form of renewable portfolio standard, while seven additional states have implemented voluntary goals. We're also seeing states with no formal policy support for renewables, especially in the Southeast, developing more solar PV projects based on the economics and the popularity of solar power among corporate buyers.

LOWER CORPORATE TAX RATE WOULD CUT DEMAND FOR TAX EQUITY

On the other side of the coin, if corporate tax rates decline from 35% to 15%, that would make the tax equity market tighter and more competitive and may even lead some tax equity investors to decide that the tax benefits of investing in wind and solar projects are no longer worthwhile. Tax equity investors may require increased returns. On the plus side, lower tax rates would benefit overall project economics.

Changes in trade policies are more complex to analyze. Trump has accused China of currency manipulation, and has threatened to take action, including having them designated as a currency manipulator with a 45% tariff. At the same time, Trump's Secretary of Commerce Appointee Wilber Ross has at least initially indicated that there will not be a trade war.

A trade dispute with China would have a negative impact on the solar industry. Its costs or even its ability to import modules, inverters and racks from China may be affected.

However, punitive tariffs imposed in the past have had little impact on Chinese PV imports to the United States. For one thing, Chinese manufacturers managed to modify their manufacturing processes such as by resourcing raw silicon and cell production to Taiwan.

Based on a Department of Commerce analysis, punitive duties on PV equipment—which were set by estimates of Chinese subsidy rates—were as high as 38.72% at one point. Yet this didn't significantly impact the import of modules from China.

Summing up, we think the PTC and ITC will most likely be left in place. On the downside, there could be less tax equity available, which would negate some or all of the benefits of the federal tax credits. Higher tariffs and duties on imports could affect ROI for solar projects. And the IRS could potentially revise is rules for obtaining the ITC.

On the upside, domestic modules may become more competitive with a revised trade policy. ☐

New Oil and Gas Resources

- **The Administration is expected to increase access to oil and gas drilling on Federal onshore and offshore lands.**
  - Opening up the more attractive areas to leasing and drilling activity will face a variety of legal, administrative and political challenges that will delay implementation.
- **Areas likely to receive the most interest include:**
  - East Coast off-shore regions.
    - –Development will be politically challenging regardless of Administration policy.
  - Arctic regions.
    - –Economics are uncertain.
- **In the near term, economic opportunities on most other federal onshore and offshore lands will be modest, minimizing impacts on national markets.**
  - Where activity is economic, the growth in supply is likely to result in modestly lower regional natural gas prices, displacing other activity.

Coal Outlook Under Trump

- **Most Likely Scenario -** We expect natural gas prices and more coal plant retirements will keep coal consumption at current levels – remaining plants make up for additional loss of existing plants.
- **Unlikely Lower Coal Scenarios -** Sierra Club's or more moderate lower coal scenarios are unlikely or very unlikely. This is because it requires prolonged periods of very low gas prices below ICF price forecasts and or stringent regulations. Backing out all coal requires gas prices below marginal costs in spite of massive gas demand increases as coal generation is replaced and on top of those already under way – exports to Mexico, LNG exports.
- **Unlikely Coal Upside Scenario -** Trump's goal of coal upside will be hard to achieve because of retirements and strong competition from natural gas, but not impossible. To achieve his goals, he needs to stop the decline and then achieve a recovery.

Source: ICF

The major opportunity for increasing coal production is through exports.... The locus of the accessible market for coal is the Pacific Basin, where China consumes seven times as much coal as we do and is expected to increase its consumption to 10 times.

STANTEC PROVIDES RESILIENCY LEADERSHIP IN DESIGN AND ENGINEERING INDUSTRY

With $4.3 billion in 2016 revenues, up from $2.9 billion in 2015, ***Stantec*** *is one of the world's leading architecture, engineering and construction firms. According to its 2016 annual report, construction accounts for 15% of 2016 revenue added this year with the acquisition on MHW, with consulting accounting for the rest: 41% of revenue is derived from the infrastructure sconsulting, 19% from buildings, 15% environmental and 10% energy and resources. In 2016, Stantec acquired 6,800-employee MWH and four small firms. Stantec has become more focused on climate change adaptation and resilience in the last several years Responses provided primarily by Stuart Adams, a project manager with expertise in wind, flood and seismic mitigation; his colleagues John Malueg, manager of resiliency programs, and Vince DiCamillo, senior principal, environmental services, also contributed answers.*

EBJ: You're representing Stantec on the NIST Community Resilience Panel and FEMA Building Science Working Group. What are some of the main points of discussion on the NIST panel and the FEMA building science group?

Adams: The groups are collaborative platforms for contributing to ongoing resilience materials development, promoting existing resilience resources, identifying further needs in the resiliency community and ultimately addressing those needs. Each group has a distinct mission; however, both NIST and FEMA recognize the need to collaborate with industry and design professionals from public and private settings to ensure actionable resources are available.

The NIST Community Resilience Planning Guide for Building and Infrastructure is a recent publication that outlines processes for communities to implement short- and long-term resiliency measures. The Panel is currently undertaking an in-depth review of the Guide, through case study scenarios, to help ensure its members become familiar with the approach and can become resources in their communities for using the Guide.

The FEMA Building Science Working Group provides an opportunity to leverage FEMA's partnerships with private and public entities to further resilience. Tracking of consensus building code proposals, state and local building code adoptions and enforcement, as well as the promotion of successful mitigation initiatives are highlighted.

EBJ: You and your colleagues are also working for FEMA on an ASTM Flood Damage Resistant Materials Standard of Practice and FEMA's effort to designate Best Available Refuge Areas for tornadoes. How are these efforts shaping up?

Adams: I am happy to report that E3075 - Standard Test Method for Water Immersion and Drying for Evaluation of Flood Damage Resistance was recently published by ASTM. The establishment of the test method is a critical step in pursuit of a standard of practice for flood damage materials.

The standard practice will reference the test method to provide specifications and valuation criteria used to determine if a material is acceptable for use below the Base Flood Elevation (BFE).

Revisions to the Best Available Refuge Area Checklist are ongoing and will likely be implemented in an update to FEMA P-431, Tornado Protection: Selecting Refuge Areas in Building.

The current edition of FEMA P-431 was published in 2009, before the tornado outbreaks in Spring 2011. This event, that included significant impacts in Joplin, Missouri, and northern Alabama, has been researched by a host of stakeholders including FEMA and NIST. Understandings from this event, as well as other recent tornado outbreaks and research findings will be integrated into an updated publication.

EBJ: Regarding any or all of the above-mentioned initiatives, what outcomes do you expect to see and what will the likely impacts be on the design and engineering profession? (Stantec has stated that it anticipates resilience thinking, like sustainability, will be integrated first into higher education curricula and then with data backed by research into its industry's standards of practice.)

Adams: The Flood Damage Resistant Materials Standard of Practice will likely become the source for rating and then selecting materials that comply with National Flood Insurance Program (NFIP) guidelines. Reference of this standard could also be considered in consensus codes including the International Residential and Commercial Codes.

A revised tornado refuge area methodology will be published in an updated version of FEMA P-431, Tornado Protection: Selecting Refuge Areas in Building. Architects and engineers reference this publication to provide an interim tornado refuge area or areas prior to the construction of a FEMA certified tornado shelter.

EBJ: The flood-resistant materials and tornado refuge work is being done as part of a five-year, $600 million FEMA contract for flood risk mapping and hazard mitigation through a JV named Strategic Alliance for Risk Reduction II (STARR II). Please tell us more.

Adams: STARR II is a joint venture (JV) comprised of three proven leaders in DFIRM mapping, risk assessment, risk communication, mitigation planning and building science: Atkins, Stantec and Dewberry. Under this contract, FEMA leverages architectural and engineering services across the Risk MAP, HMTAP and Building Science programs to: develop high-quality data and publications; increase awareness; and facilitate local mitigation actions to reduce risk.

EBJ: How important is technical expertise (like that which enables you to serve on these groups) to winning climate change and resilience work these days?

Adams: The technical expertise to understand the low-hanging-fruit approach for implementing resilience into the project design is critical to many clients. The ability to provide this knowledge stems from previous experience with similar

projects and the expertise gained by participating in resilience development and implementation initiatives.

Often, our clients seek direction on how to implement resiliency into their projects—it's not always established in the RFP. We must lean upon our background in similar projects and our technical expertise in resilience to provide a feasible solution.

EBJ: Among the skills your resilience practice offers is "risk communication." Can you share something about the challenges and opportunities in this area and the value you provide?

Adams: Defining risk is often a case-by-case scenario, as different stakeholders have differing assets and goals. However, communicating risk in a simple, standardized, and actionable manner is necessary for success.

The term 100-year flood design is not always understood by the average homeowner. However, when it is communicated that the likelihood of a 100-year flood event occurring during a typical 30-year mortgage timeframe is greater than 1 in 4, homeowners take notice.

When it is further communicated that the 100-year flood design doesn't account for climate change factors, and the inherent risk could be even greater, the impact is further realized and conveyed in an easy to understand manner.

EBJ: Within Stantec, how many full-time equivalent employees would you say are working on technical aspects of resilience? How about your entire climate change adaptation and resilience practice?

Malueg: This is difficult to quantify. We integrate resilience thinking into everything we do, all sectors, all disciplines, from project conception through planning, design and implementation.

However, an indication of the influence of the resilience market on our resources is illustrated by our coordinated response to HUD's NDRC competition. Stantec engaged more than 50 resiliency experts from 10 offices across North America to address the extensive program requirements. This group included urban planners, architects, risk mitigation specialists, coastal modelers, structural engineers, water resources and environmental engineers, climate change experts, cost estimators and landscape architects.

"Our developing resilience industry must educate and come to consensus on what resilience is."

EBJ: The term "resilience" has come to be substituted for "adaptation" over the last two to three years. On the one hand, it seems like a pragmatic political choice of words to appeal to climate change skeptics and deniers; and on the other hand, it really is a broader concept, often with economic and social elements factored in. Any thoughts on this?

Malueg: Interesting observation and topic. We offer the following in an effort to provide insight to how the two words have and are influencing our market place.

Most of our observed references to adaptation have been associated with "climate adaptation" as it relates to addressing the impacts of climate change. We see climate change as a catalyst to the resilience marketplace where resilience without climate change represents good business, while climate change and associated changes in the frequency and magnitude of catastrophic events simply makes the business case for resilience stronger.

Regarding integrating economic, social and may I offer, environmental elements into the resilience discussion, at Stantec we support this way of thinking at the highest level. Some of the greatest opportunities associated with considering resilience in a project's planning and design relate to the opportunities of breaking down traditional silos, getting input from diverse stakeholders, redefining how success is defined and expanding how benefits are measured.

Stantec experienced the power of resilience thinking in our role supporting HUD's $1B National Disaster Resilience Competition, where 13 applicants were ultimately selected to pilot what resilience looks like in the form of implemented projects across the United States.

Based on resilience focused approach that promoted a comprehensive identification of diverse benefits, returns on investment of greater than 2:1 were consistently achieved. Awarded projects ranged from restoration of degraded riverine floodplains and wetlands, reconnecting and protecting economically isolated coastal neighborhoods through investment of mixed green-grey infrastructure to the implementation of a watershed plan to protect watershed and forest health.

EBJ: Adequate insurance coverage is a key component of resilience, as many in the Northeast found out the hard way when Superstorm Sandy inundated properties that didn't carry flood insurance. You're working with the Insurance Services Office and the Institute for Business and Home Safety. Tell us about what you're up to and how insurance can support and encourage resilience and adaptation.

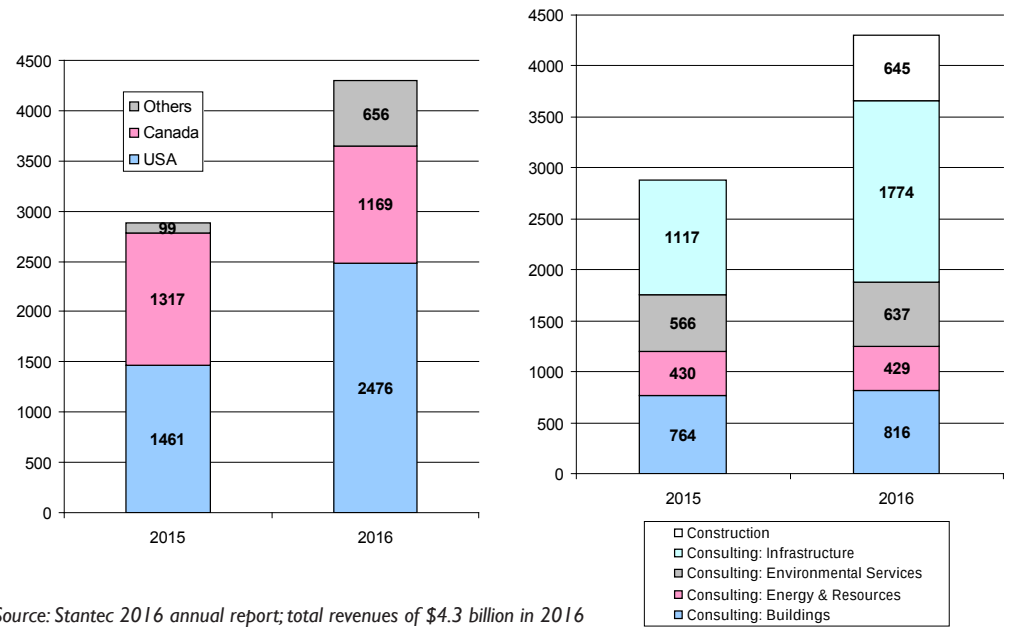
Adams: The Insurance Services Office, through its Building Code Effectiveness Grade System Questionnaire, provides actionable information on the usage of building codes throughout the country. Significant efforts are pursued every year to strengthen building codes such as the International Building Code and their reference standards including ASCE 24 and ICC-500. Ensuring that jurisdictions are adopting and enforcing the latest building codes, helps move our infrastructure in a more resilient direction and can often lead to reductions in insurance premiums.

I see the adoption of current, consensus building codes without weakening amendments as the catalyst for a resilience snowball effect on our nation's buildings and infrastructure. The IBHS Fortified Standards are a "code-plus" approach to building design that is at the forefront of resilient design. The benefits of this program include a peer-reviewed and reputable process for addressing resilience in building construction. The Resilient Design LEED Pilot Credits implement many of the IBHS Fortified Standards in their approach. This merger of a widely accepted and known resource efficiency rating system with resilience can be a catalyst for continued

growth.

DiCamillo: With regard to insurance as it relates to the NFIP, rating has always been based on existing conditions. To my knowledge future conditions have never been factored into the insurance ratings. However, consideration of future conditions has been a push on the floodplain management side. Whether it is the changing climate or consideration of future development, going beyond minimum standards has been encouraged for years.

Stanec Revenues by Region and by Service: 2015-2016 ($mil)



Source: Stantec 2016 annual report; total revenues of $4.3 billion in 2016

Some states have adopted freeboard requirements for setting first floor elevations as a margin of safety. This is typically to account for uncertainty in the actual computations of flood elevations and for potential impacts due to upstream development that could change runoff characteristics in the watershed.

Also note that FEMA flood studies typically assume unobstructed flow at bridges and culverts. Meaning that in an actual flood event, debris could obstruct bridges or culverts causing higher than expected flood elevation upstream of (or behind) those structures. For these reasons, the freeboard approach is highly recommended. Wisconsin, for example uses 3 feet above the BFE (base flood elevation) for the lowest floor requirement.

EBJ: How do you see the adaptation and resilience field evolving over the next two to five years? Will there at some point be a drop-off in demand for specialized climate resilience and adaptation work as the projections simply become integrated into building codes and design and engineering practices?

Malueg, Adams and DiCAmillo: Not based on any formal survey or data, we believe resilience integration into our industry is only in its infancy with only a few of the larger coastal cities developing first iteration resilience plans, which are generally focused narrowly on more frequent tropical storms and sea level rise.

This new resilience market has yet to implement many projects beyond pilot projects with the focus for most of those projects being limited to natural hazards and coastal flooding. The market has not yet addressed non-coastal areas nor recognized the relationship between natural and man-sponsored disasters.

Our prediction for the next two to five years is further resilience market development, further completion of preliminary vulnerability/risk assessments and the queueing up of the real work including detailed planning, design and implementation of resilience projects and programs.

Finally, we believe as the resilience marketplace matures and becomes more secure in its service offerings and metrics, then our industry will ultimately take a step back and revisit the relationship between resilient and sustainable design, acknowledging that the two focus areas are not always in alignment.

At some point, there will be drop-off in demand for specialized climate resilience and adaptation work—and ideally the sooner the better as it could be interpreted as a metric of how effective and influential our industry is. But unfortunately, as in the examples of the lack of flood and earthquake insurance coverage in places of high vulnerability, there remains a void of understanding, education, leadership and political will to adopt new laws and ordinances requiring our building and development industry to significantly change.

Before resilience thinking, planning and design approaches can become a norm of our industry, we have a long way to go. Our developing resilience industry must:

1. Educate and come to consensus on "what is resilience?"
2. Develop credible methods, processes and metrics for measuring and evaluating resilience, resilience enhancing options and return on investment,
3. Develop resilience champions and proofs based on data that resilience represents good business, and
4. Educate, gain support and create champions of private and public sector industry leaders.

Only then will there be enough momentum and support to gain the political support and will to adopt resilence related codes, standards, laws and ordinances. ◻

ENVIRONMENTAL ENTREPRENEURS REFLECTS ON CHALLENGES, OPPORTUNITIES IN NEW POLITICAL LANDSCAPE

*Founded in 2000, **Environmental Entrepreneurs (E2)** is a national, nonpartisan group of business owners, investors and others who advocate for policies that fight climate change and protect natural resources while also creating jobs, driving economic growth and stimulating innovation. E2's more than 850 members belong to nine chapters stretching from Boston to San Diego. Collectively, these businesspeople, investors and others have founded or funded more than 2,500 companies, created more than 600,000 jobs and control about $100 billion in venture and private equity capital, according to E2. E2 is funded primarily by its members—individuals, not companies—through annual donations that range from $1,000 to $100,000 or more.*

E2 got its start in California, when a group from Silicon Valley began working with the Natural Resources Defense Council (NRDC) on advancing state legislation that became the first-ever limits on vehicle emissions and a model for today's federal vehicle emissions and mileage standards. E2 has remained an affiliate of the NRDC since then, with NRDC providing policy and governmental affairs expertise and other resources to E2's staff, chapters and members. EBJ spoke with E2 Executive Director Bob Keefe.

EBJ: E2 seems to be mostly about policy and advocacy. Do members also find value for their own business development goals, such as through networking to find collaborators and potential acquirers or acquirees?

Keefe: In addition to our support for advocacy, we keep our members up to date with weekly information about policies at the state and federal levels that cross the intersection of the economy and environment. We host monthly webinars on clean energy and other issues. And we produce reports like our national and state clean energy job censuses.

In terms of networking, our nine E2 chapters hold regular events that can be as casual as an after-work happy hour or as formal as a lunch with a U.S. senator. While our members work or invest in industries ranging from solar, wind and energy efficiency to agriculture, hospitality and venture capital, they have one thing in common: They care about the environment and the economy.

As a result, they naturally also often have businesses and interests that often overlap. I can't tell you how many times I've been to E2 events and then later heard how one or two attendees were doing business together. We've had E2 members in wind and solar, for instance, connect with farmers and other landowners on leases. We've had investors connect with startups in biofuels and other areas. We've had hospitality companies connect with energy efficiency providers.

EBJ: What's your overall take of the changed landscape for clean energy businesses after the election? What are the new opportunities? What business models or sectors will be most challenged?

Keefe: Certainly, the election of a president who says climate change is a hoax perpetuated by China, and who wants to staff his cabinet with oil industry lobbyists and executives, has cast a dark pall over the clean energy landscape. But we should all remember this administration and this Congress did not get elected because Americans don't want clean energy.

In fact, we should remember that in poll after poll after poll, Americans overwhelmingly say they want more clean energy, and they want their government to pass policies that will foster growth in clean energy.

Here's the other thing to remember: If President Trump and Congress do in fact want to create jobs and drive economic growth in America, there's no faster-growing field than clean energy. More than 3 million Americans now work in renewables, energy efficiency, clean transportation and other clean energy fields, according to the U.S. Department of Energy. That's more people than work in real estate or in agriculture—and many, many more than work in coal mining or oil and gas extraction. We're just getting rolling with clean energy in America; hopefully President Trump and Congress won't drive us off a cliff.

EBJ: With President Trump's pledge to rollback the EPA's regulation of coal-burning power plants, more of the United States' GHG commitments will have to be met by state action. Do you see states increasing their renewable energy or energy efficiency mandates or adopting climate action plans like California has done?

Keefe: We've been fortunate over the past eight years to have a president who realized the basic and fundamental necessity of protecting our environment and the incredible economic benefits of clean energy. We can only hope that President Trump comes to this realization as well —and quickly. But either way, the states—most states, that is—get it.

Governors and legislators from New York to California know smart clean energy policies create jobs, attract investments and save money for consumers and businesses alike—while helping our environment. That's why New York recently approved a plan to get 50 percent of its energy from renewables, matching California. That's why Illinois recently passed a sweeping Future Energy Jobs Bill; why Ohio decided against continuing a misguided freeze on renewable energy standards; and why Michigan lawmakers just voted to boost their state's renewable energy and energy efficiency standards.

States realize the benefits of clean energy because they're seeing it first-hand. Take my home state of North Carolina. It's the only state in the Southeast that has a renewable standard and it's now the No. 3 state for solar in the country. Along the

way, North Carolina has created more than 26,000 clean energy jobs and has attracted huge companies like Facebook, Apple New Belgium Brewing and others that have opened big operations in the state in large part because they want to tap into the state's clean energy supplies.

This isn't about Republicans or Democrats, by the way. Look at Iowa. That state is on track to get 40% of its energy from wind. Iowa's governor, Terry Branstad, is a staunch Republican, the longest-serving governor in American history; President Trump's pick to be ambassador to China—and also a huge supporter of renewable energy. So is Iowa Republican Sen. Chuck Grassley, by the way.

EBJ: You were part of the coalition to support SB32, the California bill that committed the state to cut GHGs 40% below 1990 levels by 2030. The bill didn't include an extension of the cap and trade program beyond 2020, and it's difficult to see how the Golden State could achieve those reductions without it. Cap and trade is also under litigation as a hidden business tax. What's your perspective?

Keefe: California is not just a national leader, but a global leader in reducing greenhouse gases. SB 32 sets the path for that leadership to continue. But in order to stay on that path, we must extend the cap and trade program in the next legislative session. We know the petroleum industry and other big polluters are already investing millions and gearing up for a fight to keep that from happening.

But we also know now that clean energy is not just what people want, it's an indispensable part of California's economy. More than 500,000 Californians now work in clean energy. That's more than work in the movie industry and many other fields.

As a result of the cap-and-trade program, about $900 million in proceeds have been invested in the state, across every legislative district. In all, California's clean energy policies have collectively helped attract or generate an estimated $48 billion in public and private-sector investments. Those are economic benefits every lawmaker in Sacramento needs to remember. Not continuing cap-and-trade means jeopardizing jobs and investments— and clean air and water— for all Californians.

EBJ: In a recent report E2, E4 and BW Research estimated 1.9 million energy efficiency jobs in the U.S. With more than 50% spending less than half-time in EE and one-third working in traditional HVAC, these numbers seem low for a country with a vast stock of energy-hogging buildings. What will it take to see the kind of investment that's needed to cut energy waste?

Keefe: The good news is that there are many ways to advance energy efficiency. At the federal level, we can continue to improve standards for appliances and equipment, ranging from your home refrigerator and cable set-top box to big industrial boilers and HVAC systems.

At the state level, we can strengthen state energy efficiency standards. Massachusetts provides a relatively small but mighty example of the benefits of doing so. Massachusetts has some of the best energy efficiency standards in the country and it also has one of the biggest energy efficiency job sectors in the country.

One area where we can really improve efficiency, especially in buildings, is at the city level. If all of our big buildings were a single country, it would be the third-biggest user of energy in the world. If we could reduce some of energy waste from those buildings, we'd save a lot of money, reduce a lot of carbon emissions and potentially eliminate the need for more power plants.

Cities can be a real key to energy efficiency. But with all the other constraints city governments have to deal with, they need help. Thankfully, programs like NRDC's City Energy Project are working with cities all across America to help them benchmark the energy usage of buildings, drive policies that encourage energy efficiency and help building owners and businesses to implement these money and energy-saving ideas.

EBJ: Your colleagues at E4 and the Advanced Energy Institute worked with New York utilities and the solar power industry to develop a compromise position on net metering, which the NYPSC is considering. To what extent can this provide a model for other states like Nevada and California where conflict over expanding net metering could threaten the future of distributed energy?

Keefe: Net metering can be an effective, workable way to help compensate investors for their investments in clean energy. But just as utilities should be compensated for their investments in utility grids and clean energy projects, consumers and individuals should be compensated for their investments in rooftop solar, energy efficiency and other clean energy investments.

Given the nature of utility regulation, net metering is something that needs to be worked out on a state-by-state basis. The most important thing for public utilities commissioners in any state is to remember is that clean energy of every kind is creating jobs, driving investments and helping the environment.

EBJ: Most of your focus is on clean energy and GHG mitigation, but you also advocate for "targeted programs and incentives" to support innovative water technology. What are some examples that work for this goal?

Keefe: Water might be the next big opportunity at the intersection of the environment and economy. In California and other Western States, E2 is working with businesses and lawmakers to advance policies that can help address the drought while also driving innovation in water efficiency. We're talking about areas as diverse as better metering and leak detection for buildings and homes to new technologies to reduce water waste in agriculture.

In the Midwest, we see a lot of opportunity to advance policies to upgrade infrastructure that will prevent the next Flint, Michigan disaster while also creating jobs and driving economic growth in the water industry. Along the Eastern Seaboard, we've already experienced the results of sea level rise in places like Miami and Newport News, Va. Our state and federal governments are going to need to address issues like those - whether they want to or not. We think they could and should do so in ways that are good for the environment and also good for the economy. □

TRIHYDRO FINDS GOOD MATCH IN RIVER CITY ENGINEERING

Trihydro *is a national environmental and engineering consulting firm providing services to both the private (85%) and public (15%) sectors. Providing a variety of environmental investigation, remediation, compliance, and data management services to the petroleum sector is a particular area of strength. Trihydro maintains a staff of approximately 400 personnel in 20 offices nationwide, with resources in 24 states. Revenues were approximately $70 million in 2016. Keith Marcott is Executive Vice President and CRO. He has been with Trihydro for 18 years. He oversees Business Development and Marketing as well as New Ventures for Trihydro. He is also on the company's M&A team.*

EBJ: The recent Acquisition of River City Engineering strengthens your position in Engineering in Texas and the region as well as water and wastewater services. Has your growth and acquisition strategy recently been more about adding geographic expansion? Or in adding technical disciplines like water? Or more about broadening your client mix to new sectors?

Keith Marcott: Trihydro's acquisition strategy consists of two primary focus areas around technical disciplines and specific geographic regions. We also consider ourselves strategically opportunistic in terms of acquisitions. In the case of our latest acquisition, RCE actually satisfied our strategy of expanding our water and wastewater capabilities in a region we had been looking at for strategic growth, so it met two criteria at the same time.

EBJ: How significant was your water and wastewater services and street and drainage design prior to River City? How significant is your environmental practice broadly in terms of percent of head count or revenues and its recent growth, and what specialties do you consider differentiators for Trihydro?

Marcott: Trihydro's transportation team has significant street and drainage design experience, but our water and wastewater resume was very limited. It really was RCE's impressive resume relative to the latter that attracted us. Not only do we see a strong future for municipal infrastructure projects, but we also believe that we can better serve our solid base of refinery and other industrial clients by combining our extensive knowledge of their operations with our new water and wastewater capabilities to help them address challenges in those areas.

EBJ: How long have you known River City and how did you first meet them? Have you teamed on any contracts? How long was the process from first talking about a deal to a signed deal?

Marcott: This was a deal that falls into the strategically opportunistic bucket. We were in the midst of evaluating a number of water and wastewater firms when we were contacted by a broker with this opportunity. River City had been in business for 24 years and the owners were looking for a means of transitioning out over time. Elapsed time from initial introductions to deal consummation was approximately 12 months.

EBJ: What were the owners of River City looking for in a partner? Were they seeking an ownership transition or did you initiate the process?

Marcott: RCE was essentially looking for an ownership transition. Chief among their concerns was that their employees would be able to maintain their positions with equal or better compensation, benefits, and career opportunities. The owners are also very loyal to their long-term clients and wanted to be sure that they would continue to receive high-quality, responsive service going forward.

EBJ: How many other acquisitions have you done in recent years and what type/size have they been?

Marcott: We have completed 3 acquisitions in the past 6 years; all were 20 staff or smaller. One expanded our core expertise and increased our footprint in a particular market segment. Another was a pure geographic play. And the most recent was RCE.

EBJ: How do you deal with the integration of smaller firms? Do you rebrand immediately or operate using a combined name?

Trihydro Acquires Texas-Based River City Engineering

In late March 2017, **Trihydro Corporation** acquired Texas-based consulting firm **River City Engineering,** supporting its continued expansion into Texas and enhancing its environmental and engineering capabilities, including water and wastewater services. River City specializes in water and wastewater services, as well as street and drainage design services for clients in Central Texas, complementing Trihydro's existing civil, infrastructure, water and wastewater engineering, planning, restoration, development, and protection services In Texas and nationwide. With the acquisition, Trihydro's network of offices grows to 20 nationwide, including the new office locations in Austin and New Braunfels, Texas. Trihydro also recently opened an office in Amarillo, Texas.

According to Jack Bedessem, Trihydro President and CEO, "The acquisition of River City is an excellent fit with Trihydro's strategic goals. We are on a path to strengthen and expand our infrastructure engineering capabilities and to offer a broader range of engineering services to our clients... River City's excellent team of engineers, surveyors, and support staff significantly enhances our regional resources and technical capabilities."

"This is an exciting time for our staff and clients," said Pat Lackey, River City Principal. "River City's focus has been to provide outstanding client service with a quality work product. We are particularly pleased to be joining a firm whose culture and commitment to its employees, clients, and community align so well with ours."

Marcott: In all cases we have rebranded essentially from day one.

EBJ: Do you actively start cross-selling other services, or does that evolve with specific client relationships?

Marcott: It depends to some extent on how much capacity the firm has at the time. We generally believe in concentrating on a smooth transition rather than rushing out to pile more work on our new resources. But cross-selling in order to begin achieving synergies is something we plan for as early as reasonable.

BUSINESS OVERALL

EBJ: How has business been in general the past couple of years for Trihydro?

Marcott: Business has not been without its challenges given the price of oil and other factors. However, we feel very good about how we have come through the past couple of years given our significant focus in the petroleum market.

EBJ: Given your geographic focus in the mountain states and on the mining and resource industries historically, how have you diversified your client mix over the years, and how challenging has this been?

Marcott: Actually our footprint extends far beyond the mountain states at this point. And although we certainly do a substantial amount of work in the mining industry, petroleum remains the largest single market sector for us. Having said that, we have been on a path of diversification for at least the last ten years and have significantly increased not only the markets and geography we serve but also our menu of services.

EBJ: Do you have a dedicated business development team or more the seller-doer model?

Marcott: We use both.

EBJ: How do you see climate change issues or policy affecting your clients or your business?

Marcott: We believe that the concept and perception of climate change will in varying degrees continue to impact our clients and business for the forseeable future. Much of what has been set in motion in recent years, whether wholly or partly as a result of climate change issues will continue to have impacts on our clients. For example, the combination of politics, public opinion, and natural gas prices are going to continue to drive the conversion from coal to gas in power generation despite any changes in regulatory requirements. Our industry as a whole needs to plan accordingly.

EBJ: What scenarios do you feel are most likely for how the environmental industry or broader engineering services industry and markets will evolve during the Trump Administration?

Marcott: The industry as a whole will continue to advance simply because the extensive body of regulations driving many of our environmental-related services cannot be changed without some level of consensus within the Legislative and Executive Branches. Moreover, much of the ongoing evolution in areas such as energy generation (e.g., from coal to natural gas and renewables) is being driven by factors that go beyond regulatory requirements. Our clients in big business plan on a much longer scale than four years and generally will not place big bets on what they view as temporary changes in the regulatory landscape.

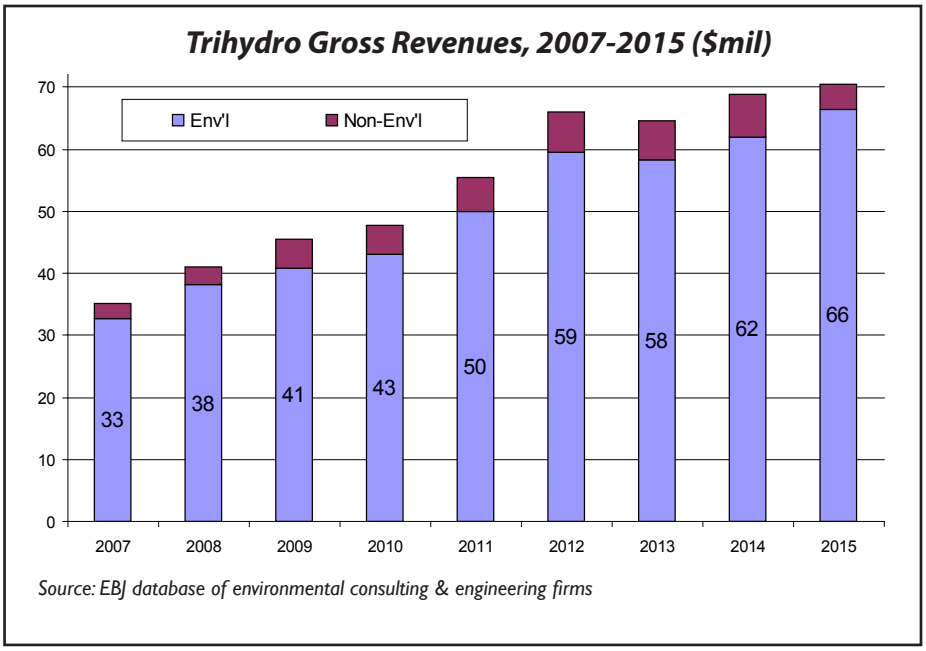
PERSONAL OBSERVATIONS

EBJ: How do you feel about the progress (or lack thereof) we have made on environmental issues in the past 40 years or so and the role the environmental industry has played?

Marcott: The industry as a whole has made significant progress on issues ranging from ongoing compliance, to sustainability and legacy liabilities. The number of newly discovered severely impacted sites has decreased dramatically over the prior four decades, and methods to managing them have greatly improved in terms of cost and pragmatism.

EBJ: How have the environmental problems you've been asked to solve changed over the years (i.e., more complex, more geographically dispersed, more stakeholders)

Marcott: Certainly there are often more stakeholders. On the remediation side, the primary challenges facing our clients are largely the recalcitrant sites that have not been adequately addressed. These are the more complex sites in terms of hydrogeology and/or stakeholder issues. □



GOING PRIVATE HAS ITS ADVANTAGES FOR TRC COMPANIES

Q&A with John W. Cowdery, Senior Vice President and Environmental Sector Director based out of TRC's San Francisco office.

EBJ: How did you first meet your new financial partner New Mountain Capital? Did you go looking for them, or did they come looking for you?

Cowdery: As a Public company, we have certain governance requirements when approached by an interested party. Over the years, TRC has been approached many times, but not with any serious offers. Around 10 months ago, our Board was approached by a strategic buyer and this put the process in motion to ensure that we conducted the best process for our shareholders. Our CEO knew of New Mountain Capital (NMC) for many years. We had multiple offers and to our great fortune, NMC was the successful purchaser.

EBJ: How hard is the 'engineering process' to convert from a public company to a private company. Can you compare it to project management in any way?

John Cowdery: Being public requires certain restrictions on Project Management processes. Revenue recognition issues, auditing and other Sarbanes-Oxley procedures do make extra work. Having third party auditors and accounting, investor relations costs and other overhead costs will disappear as we go to a private company. All of which are very positive for our operational approach. However, much of the rigor we have instituted as a Public firm we will keep because it does provide superior project management and client management procedures.

EBJ: We understand Environmental Services in general and larger engineering consulting and project management companies in particular are of interest to private equity firms across the board. Did you find this true during this process and roughly how many private equity firms or other potential sponsors and partners did you have to help take the company private?

Cowdery: We had over 20 interested parties and the final 3 where all private equity firms.

EBJ: How would you characterize the burdens of being a public company in terms of costs related to financial reporting and Sarbanes-Oxley compliance and as well as time and distractions on the part of senior management of TRC, and was this a factor in going private?

Cowdery: We were not looking to be acquired, nor did we find being a public company overly burdensome. Our transaction is a result of responsible governance, and it will work out very well for our shareholders. However, it is expensive being a public company. We should realize approximately $7 million is savings by going private.

EBJ: Public companies often refer to the arbitrage of the earnings ratios they have

TRC Goes Private in Sale to New Mountain Capital

On March 31, 2017, **TRC Companies Inc.** (NYSE: TRR) announced a definitive merger agreement with New Mountain Partners IV under which **New Mountain Capital LLC** will acquire TRC in an all cash transaction valued at $17.55 per share of common stock or $554 million. TRC provides engineering, environmental consulting and construction management services to the power, environmental, infrastructure and oil & gas markets. TRC has more than 4,100 staff at more than 120 offices in the U.S. and the U.K.

"This transaction will deliver immediate value to our shareholders while enabling TRC to continue to pursue its long-term growth strategy," said TRC Chairman and Chief Executive Officer Chris Vincze. "We are confident this partnership with New Mountain Capital represents the best path forward for all of TRC's stakeholders. New Mountain's culture and values are aligned to our own and I believe their growth-oriented investment approach, extensive industry experience and reputation for integrity differentiate them as the ideal partner for TRC."

"We believe TRC is a leading platform in the industry and have been highly impressed with the Company's best-in-class talent, exceptional culture and proven leadership team," said Lars Johansson of New Mountain Capital. "The Company has a successful track record of delivering the highest quality solutions to its customers, which we believe is crucial to their success. TRC has shown the ability to grow both organically and through acquisitions, and New Mountain is excited to support management's existing strategy and their goal of being the #1 North American engineering and construction management firm."

Matt Holt of New Mountain Capital added, "New Mountain identified the infrastructure services sector for prospective investment many years ago, and we believe it is a highly attractive industry with significant growth potential. We have been methodically studying the market for opportunities, and we selected TRC as the ideal platform to build a differentiated leader across the Power, Environmental, Energy and Transportation verticals. We admire what the leadership team of TRC has built and we look forward to working with them to support an accelerated growth plan. Our approach emphasizes growth and business building over financial engineering, and we believe this partnership will create significant value for all stakeholders including customers, partners and the TRC employees."

New Mountain plans to operate TRC as a standalone business operation with the current management team remaining in place. "TRC's success has been built on the deep expertise and knowledge base of our employees, and they remain our greatest asset and priority," Vincze concluded. "We are confident that under our new ownership our clients will continue to experience the exceptional service they expect from TRC."

compared to their acquisition targets as an advantage, as well as using public stock has a more liquid form of currency for acquisition. Presumably this is something that you are willing to sacrifice or perhaps they aren't as important to TRC now?

Cowdery: Continuing to be a large company and one with an aggressive growth ambition will continue to provide us with an arbitrage in earnings ratio's. TRC typically used cash for transactions and that will continue into the future. Ultimately, our strategy is not changing from how we have operated in the past. We will now be able to take a longer view of our strategy over a 3-5 year period, rather than having to perform quarterly as a public firm. Our future is very exciting and we are looking forward to working with our New Mountain Capital partners to achieve even greater success.

EBJ: Does the new structure change your strategic outlook or modify your plans in any way in terms of growth, acquisition, new market entry or even the consideration of overseas expansion?

Cowdery: We were developing our 5 year growth strategy at the time of acquisition by New Mountain Capital. In fact, our growth strategy was part of the reason NMC is so enthusiastic about TRC. Within our 5 year strategy we plan to grow to $1.5 billion, primarily in North America. We will be exploring expansion into new markets that are synergistic with our current operating sectors. □

We were not looking to be acquired... Our transaction is a result of responsible governance, and it will work out very well for our shareholders.

TRC Acquires 170-Person Transportation Infrastructure Firm

In April 2017 **TRC Companies** announced the acquisition of of Riverside, California-based **Caltrop Corp.** bringing 170 employees providing engineering, public relations, construction management and inspection services to the transportation infrastructure market. "The acquisition of Caltrop will enable TRC to capitalize on the growing opportunities for construction management and construction engineering inspection services in California, New York, Florida and Texas, particularly for large public works and transportation projects," said Chris Vincze, TRC's Chairman and Chief Executive Officer. "Caltrop adds technical experience and regional knowledge, while augmenting TRC's already-strong reputation in these growing geographic markets. In addition, Caltrop has fabrication inspection capabilities in China and the United Kingdom."

"Caltrop expands our capabilities to support larger-scale projects," said Doug Massih, SVP and Infrastructure Sector Leader. "We are adding depth of experience in engineering and metallurgy, as well as expertise in airports, a new market for TRC." Caltrop has been providing professional program, project and construction management consulting services since 1988. Besides Riverside, it has locations in the California cities of Irvine, Sacramento and San Diego, as well as Jacksonville, Florida, New York City, and Shanghai. David Saber, CEO of Caltrop, said: "TRC offers us an incredible platform for future growth and gives our people opportunities to pursue diverse, large-scale projects worldwide."

2020 Likes TRC-NMC Deal; Sees Clear Target for the Future

According to Al Spiers, CEO of **2020 Environmental Group**, a management consulting and M&A advisory firm focused on the environmental industry: "We know TRC well, from when the firm was trading at $2.80/share in 2010 to their high of $11.95 in March 2017. The challenge TRC management was facing is how to take the company to its next plateau…from its current watermark of nearly $500 million in Net Revenue to $1 billion in 3-5 years. As a small publicly traded company, getting market support for the required level of investment, and risk, was going to be difficult and slow. Going the private equity (PE) route, with the right financial partner, fast-tracks this growth strategy."

Spiers also believes TRC was in an advantageous position, but earned that with their strategy and resilience: "With the consolidation that has been occuring in the industry, TRC provided New Mountain and its other PE suitors, of which there were several, with an opportunity that is rarely seen in our environmental space… an upper middle market high performing company that is available for sale. This put TRC in a unique position. Also, TRC's recent M&A activities played a part in their PE attractiveness. Including their acquisition of Wilbros Professional Services in 2015, which soon after the deal closed was hit hard by the oil & gas downturn, resulting in TRC stock dropping nearly 50%. TRC withstood the pressures, making corrective actions, with their stock rebounding in 2017 into record high territory. This is a story that PEs value highly."

"The challenge going forward for New Mountain and TRC will be their exit strategy and arbitrage play," said Spiers. "For PEs this typically means doubling the firm in 4-5 years and selling into the next pricing multiple quadrant. New Mountain is paying roughly $555 million all cash for TRC, which translates into a roughly 12X multiple of EBITDA. Only a few PE-owned environmental firms have generated this high of a multiple, with ERM and Trinity Consultants recent examples. The interesting watch for us in the industry will be to see if 15-16X multiples are in the environmental industry's M&A future."

EFCG SEES GOOD MATCH IN TRC & NMC

The pending TRC - New Mountain Capital transaction, in our opinion, provides TRC with a patient, industry-knowledgeable and growth-oriented investor in NMC, positioning the firm to grow more rapidly as a well-capitalized, private e/c firm. We have been working with NMC now for a decade looking for the right platform investment for them in the e/c industry. We feel that they understand what it is to invest in a professional services firm in terms of cultural impacts, prudent rather than excessive use of debt, and being supportive of the strategic growth opportunities, organic and acquisitive. We have also been an advisor to TRC for two decades and believe that the management team, lead by their CEO, Chris Vincze, has created a firm well-positioned to thrive in this rapidly consolidating industry of ours, particularly now with what we feel is a more suitable investor base than the public equity market for a firm of their size.

The transaction highlights a few key industry trends we are seeing take place:

1) Challenges for "Small" Public Firms: It tends to be especially difficult for e/c firms with less than a billion in revenue to be publicly-traded, because they struggle to attract the analyst coverage needed for large institutional investors, and their stock tends to be pretty illiquid, which leads to lower valuations and create more volatility (perhaps with the exception of **NV5**, which has been extraordinarily successful as a smaller firm). There are about a dozen or more e/c firms which have gone private over the last decade. In addition, TRC had to incur substantial costs related to being public, which are easier for much larger firms to absorb.

2) Increased interest in the e/c industry by private equity firms (and Public Market Investors): Over the last few years, we have noticed increased interest in the e/c industry from private equity firms, who are attracted to the strong growth trends, consistent profitability, and positive outlook, especially if the proposed infrastructure spending plans materializes. As P.E. interest has grown, firms of nearly any size are provided with an alternative form of capital, which historically was not as abundant or widely available. Similarly, particularly since the presidential election, public market valuations of e/c firms have increased noticeably. EFCG's 'E/C Index' P/E rates of 23 North American publicly traded firms jumped by ~25%, between November 8 and today. This has provided public e/c firms with a cheaper source of capital, which they are looking to deploy in acquisitions to, in turn, satisfy the public markets implied higher growth expectations (as reflected by higher P/E multiples).

3) M&A Valuations & Activity at all-time highs: In our nearly 30 years in this industry, we have rarely seen such high levels of M&A activity, which is illustrated by some of the other "mega" deals taking place in the industry (Amec Foster Wheeler-Wood Group; Atkins-SNC Lavalin), and, the number of M&A assignments we are currently working on. Adding to this phenomenon is the current state of M&A valuations, which are at all-time high levels, akin to what we saw in 2007. A few key potential drivers behind these valuations and activity are: high stock prices of publicly-traded a/e/c firms, who tend to be the most active acquirers; the inability of the largest firms to grow organically, which leads them to rely on acquisitions for growth; low interest rates and easy access to debt; and, a lack of high quality firms (i.e. firms with a strong track record of growth and profitability) that are looking to sell, as most of these firms have either already sold, or have solved the internal ownership transition challenge and therefore don't "need" to sell. For these reasons, we believe we will continue to see high levels of M&A, until one or more of these conditions changes. □

Contributed by Andrej Avelini, Managing Director of ***Environmental Financial Consultng Group****, New York, leading financial and strategic advisors to the architecture, engineering / consulting & construction (a/e/c) industry.*

Dates for Upcomimg Environmental Industry Summits

- **Pacific Northwest Environmental Industry Summit II**, Thursday, July 27, 2017, Washington Athletic Club, Seattle WA
- **EBI Fall Strategy Summit II**, November 2-3, 2017, Hunton & Williams Conference Center, 2200 Pennsylvania Ave NW, Washington DC
- **New England Environmental Industry Summit II**, December 1, 2017, Boston MA
- **Environmental Industry Summit XV**, March 14-16, 2018, Hotel del Coronado, Coronado CA

The 2nd Annual Pacific Northwest Environmental Industry Summit

Join 80+ senior executives for an engaging discussion about why the Pacific Northwest continues to a strong market for the environmental industry with a balanced mix of national and regional or local players. PNEIS II is a one-day conference, where EBI will present regional and state market statistics and forecasts, and interactive panels will discuss industry drivers, new practice areas, managing growth and M&A, and a long term market outlook for the region.

EBJ's **Pacific Northwest Environmental Industry Summit II** is presented by Environmental Business International, publisher of Environmental Business Journal, and 2020 Environmental Group, in association with the Northwest Environmental Business Council

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