

GET CONNECTED

Investment Recovery Association Conference & Trade Show

April 2-5 , 2017 | Las Vegas

Information on page 7



Trump, carbon neutrality and the next phase of business sustainability

The new administration-what does it mean? The path of reversing climate change has been going in the opposite direction since the 2016 election. The Trump administration has tapped climate skeptic Scott Pruitt to head up the Environmental Protection Agency (EPA) in addition to a transition team led by and stacked with fossil fuel interests. ▶ Page 4

Google and the Ellen MacArthur Foundation: A Circular Economy Case Study

Global business has a key role to play in moving from an economy based on a "take-make-dispose" model to one based on a restorative and regenerative system. The linear model is reaching its physical limits: Recent data shows that in 2015, global demand for resources was equivalent to 1.5 times what Earth can support in one year. ▶ Page 13



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PRESIDENT'S MESSAGE

HAPPY NEW YEAR!

We've launched into 2017 with aspirations of greater prosperity, health and relationships than we had last year. It's my hope that the holiday season included time with friends and family, opportunity to get some needed rest and recuperation, and time set aside to focus on setting goals for this new year.

If you're like me, there was an end-of-the-year sprint to close deals and move out material before taking time off. Now that the rush is past, the realism of a new beginning is evident. Moreover, this year is different because it will see the hand-off of the baton of leadership from an eight-year Democratic Party reign.

That alone will potentially change the face of our business for the next four or more years. Issues that were in the forefront of the current administration (global warming, greenhouse gas regulations and shuttering coal-fired plants) may now be revisited by the new administration. Only time will reveal the real impact of the Trump administration to our industry, but I suspect there will be a shifting of tides in the next year.

Most of the member companies have implemented sustainability functions and reporting. We have infused sustainability's "three-pronged" thinking into our organizations, balancing the environment, economics and social factors (people, planet and profit) to find the proper balance. We have implemented the 7 R's of Investment Recovery to refurbish, redeploy and recycle where possible to encourage progressive thinking as well as minimizing waste and landfills. These concepts just make good sense. They are not mandated by writ of regulation, but because of the influence of our affiliation with the Association, they have become foundational to the thinking in most of our enterprises. I suggest the impetus of sustainability is led by business and any change in national leadership will have little impact.

Coming on the horizon for the IR professional, though, is the concept of the circular economy. The idea involves long-term thinking in product design and manufacturing that has the re-use of components or materials built in. The idea is meant to reduce waste and landfill by reutilizing material and components or reenter them into the biosphere with a positive impact. The idea of design, manufacture, use, discard will be replaced by design, manufacture, use, disassemble, reuse components or materials. It will leverage creative thinking and planning and will open doors for the IR professional to find new partnerships with other possible users of unwanted enterprise components or materials.

Both of these will be elements we, as industry professionals, need to be fluent and proactive to lead our organizations in the next years. Included in this issue are two outstanding articles relevant to these topics. I encourage you to read, research and hone your knowledge. I believe we will see these topics on the agenda at future conferences.

In closing, 2016 is in the history books. However, you and I have the power to make 2017 a year of impact for our enterprise. Why not ensure you have all the tools necessary for your success by registering for the 2017 IR Convention in Las Vegas? Download the full brochure and registration at www.invrecovery.org/2017-tradeshow. You can even attend for free, just by bringing a colleague via the "Plus 1" program.

I look forward to seeing you there.



Barry Street, CMIR,
FPL/NextGen Energy
President, Investment Recovery Association / barry.street@fpl.com

P.S. See the +1 promotion on page 17 to learn how you can attend for FREE! April 2–5, 2017, Las Vegas, Nevada.

Trump, carbon neutrality and the next phase of business sustainability

Sustainability means business

For those in the business of investment recovery, environmental protection and sustainability, this is a disturbing development at the highest level of government.

Yet many within corporate America are heading in another direction. Consider Kevin Butt, regional environmental sustainability director for Toyota Motor North America, and his charge to take the company “beyond zero environmental impact” by reducing and eventually eliminating CO₂ emissions from vehicle operation, manufacturing, materials production and energy sources by 2050.

This type of effort is not as crazy as it may seem. Solutions to climate change require new types of aggressive thinking. While global treaties to reduce greenhouse gas emissions are important, they are not enough. Eventually society has to go carbon neutral, and then it has to go carbon negative.

The ultimate responsibility for making this shift is falling first and foremost on business. Companies are developing the next buildings we live and work in, the clothes we wear, the food we eat, the forms of mobility we employ and the energy systems that propel them. With their unmatched powers of ideation, production and distribution, business is the only entity that can bring the change we need. Indeed, if there are no solutions coming from the business world, there will be no solutions at the necessary scale.

While business has been addressing sustainability challenges since the 1990s, and climate change since the 2000s, the focus of this effort is now at an inflection point, as Toyota’s “beyond zero impact” effort shows. Rather than looking to government for solutions, many businesses are taking responsibility for climate change seriously and changing the system on their own.

Business sustainability 1.0: Enterprise integration

Over the past quarter-century, companies have framed environmental sustainability as a market shift that fits into the existing ways of managing a business, an approach that we at the *Erb Institute for Global Sustainable*

Enterprise call “Enterprise Integration.”

The notion is that key business constituents bring sustainability to the business through existing corporate functions, thereby making it a strategic concern.

For example, Whirlpool is innovating on appliance energy efficiency, not because of corporate social responsibility, but because it has watched energy efficiency move from number 10 or 12 in consumer priorities in the 1980s to number three, behind cost and performance. And it expects those concerns will continue to grow. Similarly, most auto companies are moving into hybrid and electric drivetrains because they see electrification as the future of the sector.



Like Toyota and its hybrid Prius program, GM invested in electric cars such as the Chevy Volt (seen here in production) to be part of the auto industry’s move to electrification, not solely to meet government mandates. Jim Merithew/Wired.com, CC BY-NC

To make the business case, companies turn to traditional sources and motivations. Once insurance companies apply sustainability pressures on the business, the issue becomes one of risk management. From competitors, it becomes an issue of strategic direction. From investors and banks, it becomes an issue of capital acquisition and cost of capital. From suppliers and buyers, it becomes an issue of supply chain logistics. From consumers, it becomes an issue of market demand.

Put in such terms, much of the specific language of sustainability recedes, being replaced by the core language of standard business strategy. As such, companies can remain agnostic about the science of particular issues (such as climate change) but still recognize their importance as business concerns. In doing so, they are turning the false dichotomy between the economy and the environment on its head.

Indeed, recent surveys show that 85 percent of business executives believe that climate change is real (well above the national average of 64 percent) and more than 90 percent of CEOs believe that sustainability in general is important to a company's profits. This leads more businesses to develop sustainability strategies, create positions like chief sustainability officer to carry them out and publish annual reports on sustainability to track and share the results. This is the first model of business sustainability and it would seem to be setting us on a path to becoming more sustainable.

But, not so fast.

As promising as these developments are, our world continues to become less, not more, sustainable, and the nature of the problems we face are markedly different than they were in the 1990s. To mark this shift, scientists have proposed that we have left the Holocene and entered the Anthropocene, a new geologic epoch that acknowledges that humans are now a significant operating force within

the Earth's ecosystems.

Recognition of the Anthropocene has broad implications for how we think about business sustainability. Rather than fitting sustainability into the existing models of the market, we must now recognize that the market is taking control of natural systems with potentially catastrophic consequences. Climate change, ozone depletion, droughts, wildfires, food insecurity, water scarcity and the social unrest that results all point to a fundamental system failure created by our market (and political) institutions.

As a result, the first phase of business sustainability – integrating these practices within core corporate functions – is inadequate for the scope of the issues we now face. Using this model, we are slowing the velocity at which we are approaching a system collapse, but we are not averting that eventual outcome. A new model of thinking is emerging.

Sustainability 2.0: Market transformation

The next mode of business sustainability, which we call market transformation, involves corporations making systemic changes in the business environment. It sees the corporation as a positive force in society, ameliorating our legacy of harm and mitigating the impacts from a global population expected to reach nine billion by 2050.

We can already see some of the elements of this shift coming into view. Here are some core tenets of this change to creating sustainability:

• **Focus on the system.** The notion of an energy company installing a windfarm and calling itself sustainable makes no empirical sense. A more sustainable energy system incorporates the whole grid, encompassing generation, transmission, distribution, use and mobility. Google, for example, plans to run all of its data centers entirely from renewable energy by 2017. This goes far beyond a

token commitment, creating a hedge against future energy volatility by changing the overall energy system on which the company depends.

• **Involve the entire supply chain.**

Systemic approaches to business sustainability require a broader consideration of operations and supply chain logistics, using concepts such as life cycle analysis, industrial ecology and the circular economy to reduce material and energy use among all the constituents in the supply chain.

• **The government as collaborator.**

Since the days of Adam Smith, government has been the arbiter of the market, helping to set the rules in the service of humans and adapting to changes as needed. You can't price-fix, you can't collude, you can't sell drugs; we accept these as rules of the market. In the future, the market will restrict (or eliminate) the emission of greenhouse gases as a way to promote economic growth, not hinder it. Forward-thinking companies seek ways to constructively participate in policy formation.

• **Questioning our standard models and metrics.**

Ultimately, market transformation is prompting a reexamination of the models now used to understand and explain the market, such as neo-classical economics and principal-agent theory. Both of these are built on rather dismal simplifications of human beings as largely untrustworthy and driven by avarice, greed and short-term thinking. Anyone in business will tell you that their motivations and resultant strategies are far more complex. For example, some, like former GE CEO Jack Welch, are questioning the assumption that the singular purpose of the corporation is to make money for its shareholders.

As these models are questioned, new ones are emerging, from regenerative capitalism to collaborative consumption, from conflict-free sourcing to the sharing economy.

Next page ►

Different from the Reagan years

While the Trump administration's approach to the EPA bears similarities to President Reagan's scaling back of environmental policy and its logical backlash, there is one big difference. Leading sustainable businesses today are not fighting government-led environmental policies as they did in the '80s. To get a sense of the shifting economic landscape, jobs in the clean energy sector exceeded those in oil drilling for the first time in 2016 and continue to grow. Indeed, many within these and other sectors are already pushing back on Trump's dismissal of climate change and continuing with strategies of their own.

They will do this with, or without, the cooperation of governments and their political shifts back and forth on these critical issues.

For example, Toyota, in its effort to go carbon-neutral, must think systemically and include many partners, just as Tesla is doing as it challenges the calculus for electric cars sector-wide. To enact system-wide change, companies are also working with governments to phase out heat-trapping HFC chemicals, set new efficiency standards on trucks, establish transparency rules on conflict minerals or participate in negotiations on a global climate change agreement. Examples of companies doing it on their own include changes in the supply chain on rubber or the reduction (even elimination) of antibiotics in chicken.

In each of these cases, companies are stepping into, in the words of Unilever CEO Paul Polman, "a very interesting period in history where the responsible business world is running ahead of the politicians" and taking on a broader role to "serve society." ■



Andrew J. Hoffman

Holcim (US) Professor at the Ross School of Business and Education Director at the Graham Sustainability Institute, University of Michigan

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INVESTMENT RECOVERY ASSOCIATION

CONFERENCE & TRADE SHOW

APRIL 2-5 | LAS VEGAS

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EDUCATION



NETWORKING

2017

INVESTMENT RECOVERY ASSOCIATION

CONFERENCE & TRADE SHOW

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“I HAVE A CHALLENGE” SHAKES HANDS WITH
“WE HAVE A SOLUTION!”**

APRIL 2-5 | LAS VEGAS



TOP-NOTCH EDUCATION

Designed by IR for IR professionals. Take home actionable information on: organizational success, cyber security, benchmarking, the metal market, modernizing/decommissioning facilities seizing opportunities...and much more! And it gets better. Swap real-world experiences at the ever-popular roundtables for peer-to-peer best practices.

Power Certification: CMIR Exam: Sunday, April 2

Get a jumpstart on your week—and your career—by taking the Certified Manager of Investment Recovery (CMIR) Exam on Sunday. Individuals eligible to sit for the CMIR Examination must have submitted their Personal Data Forms prior to March 1, and received approval from the association office. If you would like to begin the journey to earn your CMIR designation, please contact, Jane Male, Executive Director, admin@invrecovery.org.

NON-STOP NETWORKING

Be sure to bring plenty of business cards, because the connections you make here could last a lifetime. Sitting in a session? Taking a coffee break? The opportunity to interact with peers, IR leaders and speakers is everywhere. But that's during the day! What about at night? That's when the networking really ramps up at not one but two evening receptions. Mix and mingle on the beautiful hotel grounds while enjoying cocktails and appetizers.

Power Networking: Two Receptions

Networking goes into overdrive at two evening receptions. Because you'll love the fabulous resort venue, there's no need to go offsite. Mix and mingle on the beautiful hotel grounds while enjoying cocktails and appetizers.

VENDOR SOLUTIONS

Got questions? We've got answers! The trade show floor is where market-ready solutions can put you ahead of the learning curve. With more than 50 vendors, match up your toughest challenges with the latest in product and service innovations. Find expert advice and practical information on what's hot, what's next and what you've been looking for!

Attendees include a “Who’s Who” of the largest organizations in NORTH AMERICA

Other past attendees have included:

- Abbott Labs
- BASF
- Campbell Soup
- City of Calgary
- Cox Communications
- Dow Chemical
- DuPont
- Ford, General Motors, and Chrysler
- Florida P&L
- State of Georgia
- Phillips 66
- Kimberly-Clark
- U.S. Postal Service
- Xcel Energy
- Plus many more



**To download a full brochure with registration form,
please visit invrecovery.org/2017-tradeshow**

EDUCATIONAL SESSION HIGHLIGHTS

MONDAY | APRIL 3, 2017



Workshop: Driving Organizational Success through Sustainability



Dr. Kevin Gazzara

Author & Organizational Leadership Consultant
Arizona State University,
Walton School of Sustainability



Bruno Sarda

Vice President, Sustainability
NRG Energy, Inc.



Park Howell

Founder & President
Park & Co



George Basile

Professor, Senior Sustainability Scientist
Arizona State University,
Walton School of Sustainability

In addition to providing value the bottom line, your work in investment recovery, is also an integral part of your company's sustainability picture. However, the reality is this: Many sustainability programs struggle because they are developed or integrated in ways that miss important organizational dimensions. In this dynamic workshop, you will learn how to incorporate four key pillars of success that will help your organization achieve lasting sustainable change: leadership, strategy, communication and global-context. This cross-functional team of expert practitioners and faculty will provide insights on how to:

- > Create and identify sustainability strategies that promote broad organizational success through an effective suite of actions
- > Apply global sustainability principles to your specific organizational context
- > Integrate your organization's own perspective through a sustainability lens with a global context
- > Employ leadership competencies and behaviors that are critical to leading lasting, transformational change
- > Communicate effectively about sustainability with key stakeholders and audiences

Get the most out of your Trade Show Experience Panel with exhibitors and attendees, showing the benefits of using a trade show to improve relationships and bottom line

KEYNOTE SPOTLIGHT: The Champion's Code:

Building relationships through life lessons of integrity and accountability from the sports world to the business world.



Mr. Bernstein is an award-winning business speaker featured on CNN, ESPN, Fox News and the Wall Street Journal. He has interviewed more than 500 professional athletes and coaches who were part of championship teams. Ross concluded that the same metrics and characteristics common among sport champions were also found in top business performers. In an engaging, provocative and visually entertaining style, Mr. Bernstein will use inspirational stories from the world of sports to show participants how to:

- > Create a "culture of excellence" via extraordinary customer service
- > Generate momentum by utilizing the "currency of karma"
- > Follow your moral compass to win "the right way"
- > Be better leaders and create more "buy-in" by embracing change and failure
- > Evolve from "order takers" to "trusted partners"

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EDUCATIONAL SESSION HIGHLIGHTS

TUESDAY | APRIL 4, 2017



Opportunity Thinking™

Pam Henderson, Ph.D
NewEdge

First 200 registered will receive Pam's book: "You Can Kill an Idea but You Can't Kill an Opportunity."

Ms. Henderson is co-founder and CEO of NewEdge, Inc, a growth strategy and design firm. In this session, leave your old ways of thinking behind to experience Opportunity Thinking™.

Pam takes you on a creative journey where market forces, business models, technology, organizations, environments and design set the stage for unlimited opportunities. IR professionals are encouraged to think out of their comfort zone to discover new business scenarios.

Is That Asset a Liability? The Cyber Risk of Investment Recovery

Chad Pinson, Managing Director
Stroz Friedberg

Cyber security extends into all aspects of property, plant and equipment.

Really? How is that?

IR depends on finding latent value in assets. But what about the hidden risks? As more assets and systems become connected, remotely accessed and controlled—more cyber vulnerabilities are exposed.

What IR cyber risks should you be aware of and how can those threats be mitigated? This session keeps you one step ahead to find hidden value—while avoiding hidden liability.

BREAKOUT: #1 (you pick)

Analysis & Appraisals

Lee Robinette, ASA, Collateral Evaluation

Mr. Robinette will share his experience and knowledge of analyzing and appraising equipment. He will take us through the Analysis and Appraisal steps:

- > Defining the problem
- > Assembling pertinent data
- > Gathering market research (from both new and used markets)
- > Applying knowledge and appropriate appraisal techniques
- > Possessing the experience and judgment to reach an appraisal conclusion

PANEL DISCUSSION: Prospective on Investment Recovery at Facilities

This panel will provide a prospectus on the impact asset recovery has from a financial and logistics perspective on facility modernization and decommissioning. These types of projects are on the rise and this panel will bring a valuable perspective to the audience. The panel consists of an investment recovery professional, demolition contractor, environmental contractor, owner's engineer and state representative. The panel will discuss decommissioning and modification processes, what preparations are needed to optimize the project and lessons learned, positive and negative.

BREAKOUT: #2 (you pick)

CMIR: Scrap Recycling and the Environment

As an integral part of the 7Rs of Investment Recovery, you will learn about the proper sustainability methods that can mitigate risk and create value for your IR department and your company's customers and community.

Analysis & Appraisals Workshop

Lee Robinette, ASA, Collateral Evaluation

Lee will hold a hands-on workshop that will take participants through three hypothetical "appraisals" in working groups.

BREAKOUT: #3 (you pick)

Key Findings from the Recent Benchmark Study

Sean Byro, CMIR, Arizona Public Service

The Investment Recovery Association recently released its 2015 Benchmark Study Results. How do you interpret the findings, how do you use this data, or more importantly, how should you use this data to demonstrate your return to the company.

CMIR: Warehousing, Logistics, Sales

Knowing what is in your warehouse and how much space it takes is good IR practice. Understanding the logistics terms while getting your surplus to the next location is critical to the bottom-line result of the sale.

These items as well as sales and marketing tips and tactics will be shared during this one-hour breakout session.

EDUCATIONAL SESSION HIGHLIGHTS

WEDNESDAY | APRIL 5, 2017



Cost to Benefit Analysis

Mike Mitchum, CMIR, AECOM

What is the true net return on an asset sale? What is truly best for the company and the project? This session breaks down the math for the rest of us! Do not be fooled by large purchase offers that might not be what they seem at face value. Learn to do the math!

- > Become a better negotiator by learning how to properly evaluate a purchase offer
- > Know how to effectively perform a cost-to-benefit analysis—including hidden costs
- > Minimize cost overruns and schedule slippage in the planning stages

Legal Issues Facing Investment Recovery

Jim Cavanagh, Senior Counsel
Warner, Norcross and Judd

IR legal issues rank high as major stress producers. This session will help identify and clarify the most critical legalities each IR professional should be prepared for within your organization. Key topics include anti-trust – the good, the bad and the ugly and why you need a 360-degree understanding of it. In addition, Mr. Cavanagh will demystify contract language and other legal-related items that IR pros need to know.

Economics and the Metal Market Focus

Tatiana Bailey, PhD
Executive Director, Southern Colorado
Economic Forum University of Colorado

The sluggish metal market has taken its economic toll on recycling longer than anticipated. When will this market swing the other way? IR professionals count on the metal recycling market as a critical component to their budget. Is 2017 the turnaround year? Tatiana Bailey will provide an in-depth economic forecast explaining important factors impacting your role in investment recovery.



HOTEL ACCOMMODATIONS

Reserve by March 10 to receive the special rate of \$169 single/double + tax.

The headquarter hotel is the JW Marriott Las Vegas in Summerlin, Nevada. You may reserve your room at <https://aws.passkey.com/event/15493824/owner/25334/home> or call **702-869-7017** before Friday, March 10, 2017 to receive the special conference rate of \$169 plus applicable taxes. The guest room rate of \$169 plus applicable taxes will be extended three days prior to and after the conference based on the resort's availability. As an Investment Recovery Association conference guest, you will also be provided a 10% discount on spa treatments at Spa Aquae. There

is complimentary self and valet parking for all attendees. Complimentary shuttle service is provided to and from the Strip. A 19-passenger van is available on a first-come, first-serve basis and runs on a daily schedule.

We've negotiated a special seminar rate at the hotel. The last several years, the hotel sold out completely, so book early.

Be sure to state you are with the Investment Recovery Association 2017 Spring Conference.



Investment Recovery Association Conference mobile App

Join the conversation before, during and after the meeting. The exclusive app can be downloaded at the Apple Store or on Google Play. Once registered and paid, you may establish your profile and begin networking, asking questions and staying in the loop of what is happening.

REGISTER TODAY: invrecovery.org/2017-tradeshow

SCHEDULE AT A GLANCE

APRIL 2-5 | LAS VEGAS

| SATURDAY, 4/1 | MONDAY, 4/3 | TUESDAY, 4/4 | WEDNESDAY, 4/5 |
|--|---|--|---|
| <p>9:00 am Board Meeting</p> <p>3:30 am CMIR Study Group</p> | <p>6:30 am Registration Opens</p> <p>7:00 - 7:55 am Breakfast</p> <p>8:00 am - Noon Driving Organizational Success through Sustainability Leadership</p> <p>10:00 - 10:15 am Break</p> <p>Noon - 1:00 pm Lunch & Networking</p> <p>1:00 - 1:30 pm Get the most out of your Trade Show Experience <i>Panel with exhibitors and attendees, showing the benefits of using a trade show to improve relationships and bottom line</i></p> <p>1:30 - 3:30 pm Keynote The Champion's Code Ross Bernstein</p> <p>3:30 - 5:30 pm TRADE SHOW</p> <p>5:30 - 7:00 pm Welcome Reception on the lawn</p> | <p>7:30 - 8:15 am Breakfast</p> <p>8:30 - 10:00 am Opportunity Thinking Pam Henderson</p> <p>10:00 - 10:15 am Break</p> <p>10:15 - 11:30 am Is That Asset a Liability? The Cyber Risk of Investment Recovery Chad Pinson</p> <p>11:30 am - 1:30 pm TRADE SHOW & LUNCH</p> <p>BREAKOUT SESSIONS: YOUR CHOICE</p> <p>1:30 - 2:30 pm Panel Discussion: Prospective on Asset Recovery at Facilities Analysis & Appraisals Lee Robinette, ASA</p> <p>2:40 - 3:40 pm CMIR: Scrap Recycling and the Environment Analysis & Appraisals Workshop Lee Robinette, ASA</p> <p>4:00 - 5:00 pm Benchmark Key Findings Report Sean Byro, CMIR</p> <p>CMIR: Warehousing, Logistics, Sales</p> <p>5:00 - 6:00 pm RECEPTION</p> | <p>No Breakfast</p> <p>8:15 - 9:15 am Cost to Benefit Ratio Mike Mitchum, CMIR</p> <p>9:20 - 10:00 am Legal Issues, Jim Cavanagh—</p> <p>10:00 - 11:00 am Economics and Metal Market Focus, Tatiana Bailey</p> <p>11:00 - 12:30 pm Lunch with Annual Meeting and Door Prizes</p> <p>12:30 pm Departure</p> |
| SUNDAY, 4/2 | | | |
| <p>9:00 am Board Meeting</p> <p>9:00 am CMIR Exam</p> <p>NEW TIME</p>  <p>NOON Registration Opens</p> <p>1:00 - 3:00 pm Committee Meetings</p> <p>3:00 - 3:30 pm Board Meeting w/Committee Chairs</p> <p>5:00 - 6:30 pm Navigation & Networking at the Conference</p> <p>5:00 - 6:30 pm Early Arrival Networking Session <i>Informal session with cash bar available</i></p> <p>6:00 pm EVENING OPEN</p> | | | |



Be Recognized as an Investment Recovery Professional!

Stand out among a list of candidates applying for the same position or promotion at a company. It shows your commitment to education and your professionalism.

Complete the CMIR Personal Data Form (CMIR-PDF) by **March 1, 2017**, which can be downloaded here: invrecovery.org/knowledge-center/cmir

If your investment recovery duties account for 50% or more of your time and you have three years or more experience, you should consider earning the CMIR. Your career will thank you.

The Certified Manager of Investment Recovery (CMIR) was established in 1994 to recognize and distinguish those who have reached one of the highest levels of knowledge and experience in investment recovery.

Here are just a few reasons why you should take the CMIR exam at the next conference:

- Demonstrates to others that you are committed to excellence in investment recovery and have an ongoing pursuit of knowledge

- Up-to-date understanding of every aspect of investment recovery, future trends and strategies essential to your and your program's success
- A symbol of leadership and accomplishment
- Gain a broad understanding and knowledge of Investment Recovery best practices
- Credentials related directly to job duties based on knowledge and experience in the field
- Professional recognition and exposure to aspects of investment recovery not normally or regularly part of your job

Google and the Ellen MacArthur Foundation: A Circular Economy Case Study

By, Shobhit Rana and Kate Brandt

At Google, they believe in the democratization of knowledge, which is why they are committed to organizing the world's information and making it universally accessible to everyone. They are also committed to doing that in a planet-friendly way via a circular economy. This process is both restorative and regenerative by design, and aims to keep products, components and materials at their highest utility and value at all times.

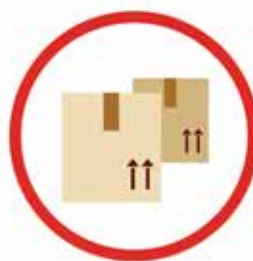
Key elements of the circular economy model optimize resources by circulating products, components and materials in use through different loops of the use cycle:



MAINTAIN / PROLONG



REFURBISH / REMANUFACTURE



REUSE/REDISTRIBUTE



RECYCLE

A strategic partnership

Google has partnered with the Ellen MacArthur Foundation (Foundation) to help them enhance and embed circular economic principles into Google's infrastructure, operations and culture. The Foundation works through education, business innovation and analysis to help drive the transition to a circular model. There is no better example of how Google is implementing circular economy strategy at scale than its hardware management inside its data centers. This case study reviews the practices implemented through maintenance, refurbishment/remanufacturing, redistribution/secondary market sales and recycling. These practices combined with Google's circular approach to optimizing end-of-life of servers based on Total Cost of Ownership (TCO) principles have saved hundreds of millions of dollars per year.

Background

Google is always pushing for the most energy-efficient, highest-performing compute in every piece of hardware and square foot of its facilities. Its high-performance computing is the result of maximized operational optimization from the design of its servers

to machine-learning utilization to squeezing the greatest efficiency out of its building systems. Google achieves high utilization of resources by sharing machines through compute- and storage-shared services that serve all product areas (as opposed to each product area having its own dedicated machines). One such shared service for sharing compute capacity is Borg, an architecture for scheduling and managing applications across all Google data centers. Much of its infrastructure is custom designed, from Google's own high-voltage substations to the on-site electrical distribution systems to the proprietary cooling systems. All systems work together to provide peak performance and lowest total-cost-of-ownership computing infrastructure. The result? Google saves over \$1 billion in operational costs through energy efficiency alone. In addition, Google servers don't include unnecessary components such as video cards, chipsets or peripheral connectors, which can introduce vulnerabilities. Server resources are dynamically allocated, allowing for flexibility in growth and the ability to adapt quickly and efficiently, adding or reallocating resources based on customer demand. Google optimizes server end-of-life based on TCO rather than industry standards for accounting life, which

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allows them to redeploy hardware based on remaining economic value rather than accounting book value. Google's IP data network consists of its own fiber, peering and undersea cables. This enables them to deliver highly available and low-latency services across the globe...faster to meet demand and capacity when needed.

Case Study Scope

The study encompasses machines (servers) and associated components (primary memory modules, hard disks and flash storage devices) in Google data centers and networking-related equipment (fiber optics, switches and routers). They interviewed 15 individuals across 10 Google teams to understand the current practices in data center operations and supply chain. They analyzed the data to understand the scale and scope of current practices and what further opportunities can be explored to expand circular economy practices.

Circular Economy Practices at Google

Google's supply chain for servers (Product) consists of components that make a server including: CPU, motherboard, flash devices, hard disks, memory modules and other components. Since Google manages the manufacturing and assembly operations of its custom-built servers, Google is the product manufacturer in Google's server supply chain. Each quarter Google performs an Excess and Obsolescence (E&O) process, which analyzes the life cycle stage of components and their total cost of ownership relative to new hardware, and matches demand and supply to determine E&O levels. A key outcome of the E&O process is component disposition. There are three main dispositions:



INVENTORY: Refurbished components are put back in inventory



RE-SALE/REMARKET: Any excess component supply is sold on the secondary market



RECYCLE: Materials are recycled

Multiple programs and processes within Google's Data Center Operations and Supply Chain groups apply key circular economy strategies including:

Maintain/Prolong

Repair process at the data centers expands server life expectancy, using a mix of new and refurbished parts. As servers fail and fall into repairs, defective parts are replaced by refurbished parts, which in turn enable the extended usage of parts. Hard drives/disks and memory modules (DIMMs) are the most commonly repaired (replaced) components.



In 2015, 75% of components consumed in the spares program were refurbished inventory.

Refurbish/Manufacture

Once servers are decommissioned, they are sent back to the central hub. There, they are dismantled and de-kitted to their usable components (CPU, motherboard, flash devices, hard disks, memory modules and other components). After quality inspection, components are stored for reuse as refurbished inventory. Google custom builds its own servers for data centers through a program called the Servers Build program. Refurbished parts (mentioned above) are used to build remanufactured servers and are then deployed back into data centers. In Google data centers, there is a mix of the servers running the latest technology platforms and also older platforms. Once components are in inventory, there is no distinction made between refurbished and new inventory; both are considered equivalent.

In 2015, 19% of servers Google deployed were remanufactured machines. There are two other programs where Google uses refurbished parts:

Server Upgrades

The Server Upgrades program is a process by which the useful life of servers can be prolonged by upgrading aging (not effective) technology (components) in the servers. Primary components that are upgraded in servers are hard disks/drives, memory modules (DIMMs) and flash devices (SSD). Components that come out of the servers due to the upgrade are also sent back to the warehouse and are reused by putting them back into inventory.



Spares and Repairs

The Spares and Repairs program is a process for repairing of servers and components as they fail in the data center. In 2015, 52% of components consumed in the Machine Upgrades program were refurbished inventory.

Reuse/Redistribute

Google redistributes any excess component inventory as determined by a quarterly E&O process internally. After utilizing all internal avenues Google goes through a rigorous process to ensure no proprietary Google technology resides on the components before selling on the secondary market. Google works in close collaboration with selected remarketing partners to look at various market factors for resale. There are three primary components that are resold on the secondary market: memory modules, hard drives and OEM networking equipment.

In 2015, Google resold nearly 2 million units into the secondary market for reuse by other organizations.

Recycle

Google maximizes the recycling of all data center material, including the electronic equipment that leaves its data centers. Hard drives and storage tapes that cannot be resold are crushed and then shredded. These crushed materials along with plastics and metals from other electronic waste are then combined and sent to a recycling partner for secure processing and recycling into reusable materials.

Conclusion

Thanks to their partnership with the Ellen MacArthur Foundation, Google is experiencing comprehensive value derived from applying the circular economy strategy at scale model in their servers' supply chain. As part of their enterprise-wide program, they will continue to explore other opportunities throughout the data center operations. Google is committed to continuing their circular economy model to yield additional value for business, partners and users.

Read the full article, "Google and the Ellen MacArthur Foundation," at www.ellenmacarthurfoundation.org/news/google-case-study-demonstrates-circular-economy-approach-at-scale. ■

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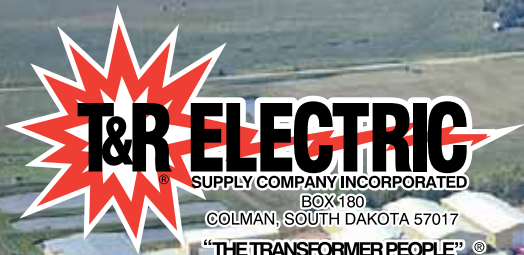


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What is the fee?

\$500 for a member, \$550 for a non-member

How do I prepare?

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- Stay current with industry trends and issues with the ASSET 2.0 Business Journal
- Take advantage of the networking and educational opportunities at the Investment Recovery Association annual conference.

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