

THE COPPER INDUSTRY:  
OUR CONTRIBUTION TO  
SUSTAINABLE DEVELOPMENT

UN SUSTAINABLE DEVELOPMENT GOALS



International Copper  
Association  
Copper Alliance

"Saving our planet, lifting people out of poverty, advancing economic growth, these are **ONE AND THE SAME FIGHT.**"

BAN KI-MOON, UNITED NATIONS SECRETARY GENERAL



In September 2015, world leaders adopted the 2030 Agenda for Sustainable Development, which includes a set of 17 Sustainable Development Goals (SDGs).

These SDGs provide a framework for addressing mankind's most critical issues over the next 15 years. There is growing recognition for the critical role of the private sector in tackling these complex issues. Public-private partnerships (PPPs) will grow in importance to ensure meaningful progress against these SDGs. This is evidenced in SDG17.



# COPPER: CRITICAL TO SUSTAINABLE DEVELOPMENT

Copper is critical to numerous areas of sustainable development. Many of the global trends driving the sustainable-development agenda rely on copper and its unique properties: climate-change mitigation and adaptation, energy efficiency and energy security, water quality, renewable energy, energy access, public health, and others. No other metal or material connects so broadly and critically with the global sustainable-development agenda.

Copper is infinitely recyclable; it can be recycled over and over again without loss of any of its inherent properties. Each year nearly one-third of copper demand is met through recycling<sup>1</sup>. Of the 550 million tonnes of copper produced since 1900, it is estimated that two-thirds is still in productive use today<sup>2</sup>. Copper is critical to the circular economy and contributes to stronger life-cycle analyses of end-use products containing it. Other materials are consumed or downcycled at end of life.

Extractive industries such as copper mining are often viewed with a narrow, negative focus. At times, the story of copper mining begins and ends with the image of an open pit copper mine or a stack at a copper refinery. Copper mines are found in challenging geographies—deserts, mountains, deep underground. Mining for minerals is resource-intensive, requiring large amounts of energy and water. Yet, without copper, our quality of life would be vastly different. Viewpoints on the production of copper need to balance the extractive nature of the industry with the important benefits it provides.

**NO OTHER METAL OR MATERIAL CONNECTS SO BROADLY AND CRITICALLY WITH THE GLOBAL SUSTAINABLE-DEVELOPMENT AGENDA.**



<sup>1</sup> [www.icsg.org/index.php/component/downloads/viewdownload/170/2092](http://www.icsg.org/index.php/component/downloads/viewdownload/170/2092)

<sup>2</sup> Glaser et al, Fraunhofer Institute for Systems and Innovation Research ISI. "Dynamic Analysis of Global Copper Flows. Global Stocks, Postconsumer Material Flows, Recycling Indicators, and Uncertainty Evaluation." *Environmental Science & Technology*. 2013, 47, 6564–6572

## OUR MISSION IS TO

*"BRING TOGETHER THE GLOBAL COPPER INDUSTRY TO DEVELOP AND DEFEND MARKETS FOR COPPER, AND TO MAKE A POSITIVE CONTRIBUTION TO SOCIETY'S SUSTAINABLE-DEVELOPMENT GOALS."*

## INTERNATIONAL COPPER ASSOCIATION ALIGNMENT WITH THE UN SDGS

At its highest level, sustainable development is at the core of the work of the International Copper Association (ICA). Our mission is to "bring together the global copper industry to develop and defend markets for copper, and to make a positive contribution to society's sustainable-development goals."

ICA's 39 members represent a majority of global copper production and include many of the largest copper and copper alloy fabricators. Each year, its members invest \$50 million into ICA's programs, with a vast majority of those funds going toward initiatives that produce a positive impact on sustainable development.

Copper and the copper industry are critical to sustainable development, and to a higher quality of life. This higher quality of life, which is often associated with the developed world, is also aspired to by three billion people in the developing world. These people represent a new global middle class set to emerge between 2010 – 2030<sup>3</sup>.

An audit of ICA's initiatives shows alignment with all of the 17 UN SDGs. These projects are working in real-world settings without the need for costly and time-consuming research and development. These projects are ready to be scaled through collaborations with like-minded organizations looking to make a positive impact on the global sustainable-development agenda.

Particularly strong alignment exists in the energy area. SDG7—Affordable and Clean Energy—underpins all of the SDGs. The main delivery vehicle for SDG7 is the UN's Sustainable Energy for All initiative (SE4ALL).

SE4ALL is a multi-stakeholder partnership between governments, the private sector and civil society. Launched by the UN Secretary-General in 2011, it has three interlinked objectives to be achieved by 2030:

1

ENSURE UNIVERSAL  
ACCESS TO MODERN  
ENERGY SERVICES

2

DOUBLE THE GLOBAL RATE  
OF IMPROVEMENT  
IN ENERGY EFFICIENCY

3

DOUBLE THE SHARE  
OF RENEWABLE ENERGY IN  
THE GLOBAL ENERGY MIX

<sup>3</sup> *"The New Global Middle Class: A Cross-Over from West to East," Homi Kharas and Geoffrey Gertz, Wolfensohn Center for Development at Brookings*



## A PROVEN TRACK RECORD OF PARTNERSHIP

ICA partners with more than 500 organizations around the world. These partnerships provide needed leveraging to expand initiatives where our missions align with organizations (the UN, governments, NGOs, private sector, etc.) external to the copper industry.

ICA has partnered with the UN on dozens of projects since 1997. Areas of successful collaboration include energy efficiency, climate-change mitigation, safe and clean cooking, public health and others. Most recently, ICA worked with the UN Environment Program (UNEP) to form United For Efficiency (U4E). U4E is a public-private partnership focused on market transformations toward efficient appliances and industrial equipment. The partnership aligns with UN's Sustainable Energy For All initiative and is an official energy-efficiency "accelerator" under SE4ALL. At

the center of the program is mandatory minimum energy performance standards (MEPS) in six product categories that will account for a majority of global energy consumption by 2030. Through MEPS and associated policies, it is possible to create massive reductions in electricity consumption and CO<sub>2</sub> emissions. By 2030 U4E aims to<sup>4</sup>:

- Reduce electricity consumption by 10 percent worldwide
- Lower CO<sub>2</sub> emissions by 1.25 giga-tonnes—equivalent to removing a half-billion cars from the road
- Create economic development of up to \$350 billion annually
- Help countries avoid investments in new power generation of up to \$500 billion

## AREAS OF SUCCESSFUL COLLABORATION

*INCLUDE ENERGY EFFICIENCY, CLIMATE-CHANGE MITIGATION, SAFE AND CLEAN COOKING, PUBLIC HEALTH AND OTHERS.*

ICA is seeking new partnerships with like-minded organizations to scale-up existing initiatives that can make an even bigger impact on the UN Sustainable Development Goals. This paper outlines ICA's program initiatives and their links to specific SDGs.

<sup>4</sup> [united4efficiency.org](http://united4efficiency.org)



## ENERGY EFFICIENCY

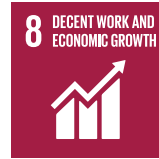
The most efficient unit of energy is the one that is not used at all.

In December 2015 an historic accord was achieved in Paris, with 196 countries agreeing to take action to limit the effects of man-made climate change. There is a growing recognition of the importance of energy efficiency in climate-change mitigation. Also in 2015, the International Energy Agency (IEA) published a report<sup>5</sup> stating that energy efficiency can account for up to half of the actions needed to limit man-made climate change to 2° Celsius.



# ICA'S ENERGY-EFFICIENCY PROGRAMS

ALIGN WITH SEVERAL  
UN SDGS:



Energy efficiency provides a three-tiered value proposition, a true win-win-win situation:

- Increased energy efficiency helps society spend less on new power-generating capacity and limits stress on grids
- Increased energy efficiency reduces utility bills and increases spending power for individuals and offers higher competitiveness for businesses
- Energy-efficient products release less CO<sub>2</sub>, offering a pathway toward fast and meaningful impact on global climate-change goals

Copper is the best nonprecious conductor of heat and electricity, so it is essential to the efficient generation and delivery of electricity to homes and businesses. Additionally, copper helps the products containing it to operate at peak efficiency. Using inferior conductors reduces efficiency, leading to wasted energy, higher utility bills, and increased greenhouse-gas emissions.

<sup>5</sup> [www.iea.org/publications/freepublications/publication/energy-efficiency-market-report-2015-.html](http://www.iea.org/publications/freepublications/publication/energy-efficiency-market-report-2015-.html)

## Partnership Opportunities

ICA leads outreach efforts for U4E, and we are looking to expand private sector and financial partners to help drive U4E's goals. ICA maintains energy-efficiency programs throughout the world, and our affiliate organization, the European Copper Institute, is the founder of Leonardo Energy<sup>6</sup>, which connects energy technologies, policies and markets. ICA seeks to partner with like-minded organizations to scale-up energy-efficiency programs worldwide.

<sup>6</sup> [www.leonardo-energy.org/](http://www.leonardo-energy.org/)

# "If countries can get their resource management right, they will be well placed to **BENEFIT FROM THE CHANGING TRADE ENVIRONMENT.**"

## AQUACULTURE

"Supplying fish sustainably—producing it without depleting productive natural resources and without damaging the precious aquatic environment—is a huge challenge. We continue to see excessive and irresponsible harvesting in capture fisheries and in aquaculture, disease outbreaks among other things, have heavily impacted production. If countries can get their resource management right, they will be well placed to benefit from the changing trade environment."—Juergen Voegelé, Director of Agriculture and Environmental Services, the World Bank.

Aquaculture, or fish farming, is critical to food supply. According to the World Bank, between 2008 and 2030 the portion of farmed fish as a percentage of overall fish in the human diet will need to more than double, from approximately 30 percent to 62 percent<sup>7</sup>. This is due to a growing population and depleted fish stocks in open waters because of centuries of unsustainable fishing practices. However, the fish-farming industry is using outdated methods, making it impossible for this industry to meet growing demand in a sustainable manner.

There are also climate-change adaptation issues that could spell disaster for the fish-farming industry:

- Rising sea temperatures will affect the viability of natural marine habitats and further limit insufficient stocks of fish for food in open waters.
- Increased frequency and intensity of storms are already causing catastrophic damage to fish farms and limiting the industry's ability to meet demand.

### Traditional Fish-Farming Technology

The technological aspects of fish farming are relatively simple and straightforward: the fish need to be contained in a controlled environment so that they can grow and be harvested at maturity. Traditional fish enclosures are made of petroleum-based, synthetic materials (e.g., nylon), which are adequate for containing fish but present a variety of problems. Synthetic materials in fish farming are:

- Weak; susceptible to damage from storms, leading to catastrophic losses for fish farmers and disruption in food supply chains.
- Vulnerable to prey (sea lions, seals, sharks, etc.), which can puncture the enclosures and lead to fish escapes.
- Highly susceptible (near 100 percent occurrence) to biofouling (growth of organic materials) on the netting itself.
  - Short service life (about three months)
  - High level of expensive and energy-intensive maintenance
  - Contaminated fish, which may require antibiotics
  - Environmental concerns with end-of-life disposal due to nonrecyclable synthetic materials and transfer of biofouled enclosures to land environments

These challenges increase the carbon footprint of the global fish-farming industry.

<sup>7</sup> [www.worldbank.org/en/news/feature/2014/02/05/raising-more-fish-to-meet-rising-demand](http://www.worldbank.org/en/news/feature/2014/02/05/raising-more-fish-to-meet-rising-demand)



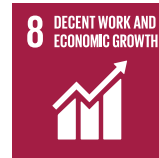
## Sustainable Fish Farming with Copper-Alloy Mesh

Copper-alloy mesh addresses the key challenges facing the fish-farming industry globally, in a more sustainable way, while improving economics for fish farmers. The benefits are diverse and significant:

- Climate-change adaptation
  - Strong; withstands harsher conditions farther offshore
  - With increased occurrence and intensity of storms, expectation that current fish-farming technologies will increasingly fail
- Environment
  - Longer installed lifetime (five-plus years vs. three months for synthetic material), resulting in reduced energy consumption and maintenance activities
  - Healthier environment for fish, leading to shorter harvest cycles and associated carbon-intensive supporting activities
  - 100 percent recyclable, resulting in a much more favorable life-cycle assessment (LCA)
  - Recycled material is used in initial production of copper-alloy mesh, which further reduces CO<sub>2</sub> emissions
- Improves fish health and production
  - Naturally improves water flow and circulation and helps maintain higher oxygen levels that inhibit parasites and pathogens from infecting fish (reduces the need for antibiotics and anti-fouling chemicals; feeding costs can be reduced by 15%)
- Excludes predators and prevents escapes
  - High-strength copper-alloy mesh resists predator attacks, thereby reducing escapes
- Reduces maintenance
  - Copper-alloy mesh rarely needs to be cleaned, lowering overall costs associated with maintenance and diver risk
- Economic development
  - Potential to expand sustainable aquaculture wherever there is a shoreline
- Prime areas include Africa, China, Latin America, Southeast Asia
  - New jobs created in a sustainable way by providing low-risk/high-reward technology



## ICA'S AQUACULTURE INITIATIVE *ALIGNS WITH SEVERAL UN SDGS:*





AT END OF LIFE, THE COPPER ALLOY  
IS A RECOVERABLE ASSET THAT IS  
**100 PERCENT RECYCLABLE.**

## Partnership Opportunities

The most significant barrier to widespread implementation of copper alloys in marine aquaculture is the initial cost. When viewed purely from a first-cost basis, this new technology is more expensive than existing ones. However, every pilot project completed (multiple geographies and fish types) has delivered lower life-cycle costs when using copper alloys.

ICA's technology lends itself to leasing, thereby spreading the higher initial cost over time:

- Service life of copper-alloy mesh enclosures is five or more years
  - Similar timeframe to leasing an automobile
- Cost of the copper-alloy mesh can be amortized over its lifecycle, with the fish farmer paying a relatively small amount each month
- At end of life, the copper alloy is a recoverable asset that is 100 percent recyclable
  - Asset value will depend on the price of copper at time of recovery
- Financing risks to both the lessor and lessee are reduced when compared with current technologies due to the proven higher performance of the copper-alloy mesh

ICA is actively seeking partners to scale-up its copper-alloy mesh technology, in particular from the financial sector, to help manage the first-cost barrier.



## DRINKING WATER

Globally, 780 million people do not have access to clean water.<sup>8</sup>

Plumbing tube is one of the oldest uses of copper. Copper is a proven, safe technology for the transportation and delivery of drinking water to homes and businesses.

The importance of the right materials in drinking water systems is exemplified in the unfortunate situation in Flint, Mich., U.S. There, leaching of lead from old service lines is having significant, negative impacts on human health. Copper is being considered by local officials to replace the lead service lines, as copper offers significant performance and environmental benefits.

Flint is raising awareness for the need to inspect and potentially replace old water service lines that could pose health risks over time.

<sup>8</sup> UN Water, 2013 World Water Day, International Year of Water Cooperation

**COPPER  
OFFERS  
SIGNIFICANT**  
performance and  
environmental benefits.

## ICA'S WORK IN DRINKING WATER

*ALIGNS WITH THESE  
UN SDGS:*



### Partnership Opportunities

ICA seeks partnerships that increase access to clean drinking water in the developing world and improve the safety and quality of drinking water in the developed world.

## PUBLIC HEALTH

In 2014 the World Health Organization surveyed<sup>9</sup> the growth of antibiotic-resistant germs around the world—the first such survey it ever conducted—and came up with disturbing findings. The organization found that resistance in bacteria (the main focus of the report), fungi, viruses and parasites is an increasingly serious threat in every part of the world. The report identified “A problem so serious that it threatens the achievements of modern medicine. A post-antibiotic era, in which common infections and minor injuries can kill, far from being an apocalyptic fantasy, is instead a very real possibility for the 21st century.”

Hospital-acquired infections (HAIs) are an epidemic, claiming more than 1,000 lives each day, which is more than HIV and breast cancer combined. This is an issue that does not discriminate between the developed and the developing world, but it is particularly critical in the latter where the rate of HAIs can be 40 percent or higher.

Through ICA, the copper industry has invested more than \$40 million to produce an impact on this societal issue, which has led to the development of Antimicrobial Copper (Cu+<sup>®</sup>) technology. More than 80 percent of the deadly bacteria leading to HAIs are spread through human touch. Copper is naturally antimicrobial, which has been known for centuries through anecdotal evidence going back to the time of Ancient Greece. However, in the last few years through the investments of the copper industry and the work of ICA, it has grown more apparent just how powerful and important this inherent property of copper can be.

The efficacy of antimicrobial copper needed to be proven in the laboratory. Lab studies showed that, when cleaned regularly, Antimicrobial Copper kills greater than 99.9 percent of certain bacteria within two hours of exposure. This testing led the U.S. Environmental Protection Agency (EPA) to register more than 500 copper alloys for their public health benefits. This marked the first time the U.S. EPA accepted the registration of a solid material for public health.

In clinical trials, with funding from the U.S. Department of Defense, the power of Antimicrobial Copper was demonstrated in real-world settings. In three U.S. hospitals, the six most frequently touched surfaces in some intensive care unit (ICU) rooms were replaced with a copper alloy. In the control rooms, no changes were made. At the end of the study, the rooms with the copper-alloy touch surfaces had infection rates 58 percent lower than in the control rooms.

<sup>9</sup> [www.who.int/drugresistance/documents/surveillancereport/en/](http://www.who.int/drugresistance/documents/surveillancereport/en/)





## ICA'S PUBLIC HEALTH INITIATIVE

*ALIGNS WITH THREE UN SDGS:*



### Partnership Opportunities

ICA is looking to partner with organizations focused on public health, primarily in the developing world where action is most critical. Opportunities exist at the intersection of public health and energy access, as the rate of HAIs is particularly high in health clinics that do not have access to safe, modern sources of energy. There are 200,000 healthcare facilities globally without energy access. Potential partners include philanthropic organizations and foundations whose missions include public health and improved healthcare.

Hospital-acquired infections (HAIs)  
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1,000 LIVES EACH DAY.**



## ENERGY ACCESS, RENEWABLE ENERGY AND ELECTRIC VEHICLES

Sustainable access to safe and reliable energy requires the use of the most efficient conductors. Copper is the most efficient nonprecious conductor of heat and electricity. Renewable energy systems rely on copper to generate and transmit energy with maximum efficiency and minimum environmental impact.

Two of the three strategic goals of the UN SE4ALL initiative are related to energy access and renewable energy. Access to safe, reliable energy is critical to many facets of human development, including:

- Alleviation of poverty
- Greater opportunities for education
- Gender equality issues
- Improved quality of life
- Public health
- And more

Renewable energy offers many benefits:

- Reduce dependence on limited fossil fuel resources
- No net CO<sub>2</sub> release into the atmosphere
- Resource-deficient nations can reduce their dependence on imported energy
- Mini- and micro-grid technologies based on renewable energy systems bring clean, safe and reliable energy access to remote locations

Part of the shift to renewable energy includes a global movement away from gas-powered vehicles toward hybrid and electric vehicles. Copper's superior conductive properties make it critical to



new automotive technologies, as evidenced by the copper content in different types of passenger vehicles: a conventional car has 8 – 33 kg of copper, a hybrid-electric has 40 – 65 kg, and a full-electric vehicle averages 94 kg of copper. Additional copper is required to ensure peak efficiency for the associated infrastructures and charging stations to support electric vehicles (EVs).

Efficient motors are critical to EVs. ICA pioneered a new technology, the Copper Rotor Induction Motor, which allows the manufacturers of EVs—as well as other users of motors—to achieve the highest possible efficiency in their vehicles' motors. This copper-based technology offers significant advantages over other technologies, including the ability to repair the motor economically without the need to replace the entire motor, the ability to achieve the highest possible efficiency rating without using rare-earth materials, reduced CO<sub>2</sub> emissions through increased energy efficiency and 100 percent recyclability at the end of life.

## ICA'S WORK IN THESE AREAS

*ALIGNS WITH SEVERAL  
UN SDGS:*



### Partnership Opportunities

ICA partners with organizations to develop and support technologies that improve the safety, reliability and efficiency of renewable energy and energy access. ICA is interested in new partnerships that scale-up these critical technologies.

**COPPER'S SUPERIOR  
CONDUCTIVE PROPERTIES**  
*MAKE IT CRITICAL TO NEW AUTOMOTIVE TECHNOLOGIES*



## ELECTRICAL SAFETY

Flawed electrical wiring is one of the greatest causes of building fires. Overloads, short circuits and faulty insulations cause billions in property damage or losses each year. Copper's superior electrical and thermal conductivity provide significant advantages over inferior conductors. Copper's unique properties make it the most secure, efficient and durable material for residential and commercial electrical installations. Copper wiring in buildings is a maintenance-free choice that lasts for decades. Other conductors require periodic maintenance (e.g., re-tightening of connections), increase the risk of hot spots and increase the potential for fires.

ICA works with partners (governments, power utilities, trade unions, etc.) to provide education on electrical safety. One such program is "Casa Segura" (Safe House), a program started in Chile and expanded to other countries in the Latin America region. The program disseminates information to homeowners in their utility bills to educate them on the importance of periodic home inspections and the benefits of safe/updated wiring. ICA has conducted similar programs in Europe, where older building stock often requires updating to ensure ongoing safety.

ICA partnered with several organizations, including USAID, Nexans, AES Electropaulo and others on a slum electrification project in Paraísopolis, the second largest "favela" (i.e., poor urban "slum") in São Paulo, Brazil, with some 20,000 households. The pilot project resulted in about 4,000 safe, reliable connections to the grid, and the program was replicated and continues to achieve strong results in the region, with more than 500,000 connections to date. Payments to the local utility are nearly 100 percent, even from individuals and businesses that were tapping illegally into the grid prior to the project. Here, an unintended benefit was articulated by the local citizens, who referred to their utility bill as a "passport to citizenship." This provided proof of address, which could be used to obtain a driver's license, apply for a small business loan, etc.



## ICA'S PROGRAMS IN THE AREA OF ELECTRICAL SAFETY *ALIGN WITH THESE UN SDGS:*



### Partnership Opportunities

ICA is seeking partnerships to scale-up its education programs in electrical safety to new geographies. ICA is also interested in partnering on projects leveraging its experience in urban/slum electrification.





If all countries adopt the U.S. style of cooling, the potential exists for a **50-FOLD INCREASE IN CONSUMPTION OF ENERGY COMPARED WITH THE U.S.**

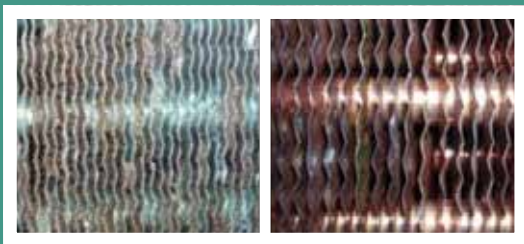
## HEAT EXCHANGE SYSTEMS

This is a critical area for advancements in new technologies as the prevalence of air conditioning continues to grow. Today the U.S. consumes more electricity for air conditioning than all other countries combined. However, unprecedented growing demand for air conditioners exists in the developing world, where electricity consumption for air cooling continues to rise at alarming rates. If all countries adopt the U.S. style of cooling, the potential exists for 50-fold increase in consumption of energy compared with the U.S.<sup>10</sup>

<sup>10</sup> U.S. News and World Report, 13 August 2012

Through its work in partnerships like United For Efficiency (U4E) and others, ICA works with governments to support higher efficiency standards for high-energy-consuming products, such as air conditioners. On the technology side, ICA partners with leading manufacturers and R&D facilities to develop next-generation heat-exchange systems that increase the efficiency and utility of air conditioners and other systems. As an example, ICA led the development of an all-copper heat exchange system. These are inherently more efficient as copper fins replace aluminum fins, taking advantage of copper's antimicrobial property. In this environment, copper inhibits the growth of mold, which over time clogs the fins and lowers the efficiency of the air conditioner. In side-by-side testing, aluminum heat exchangers exhibited 60 percent mold growth and 27 percent capacity loss (after equivalent of four years of usage). In addition to loss of efficiency, mold spores represent a health hazard, and all-copper heat-exchange systems can have a positive impact on air quality.

In the figure below, the unit on the left shows mold buildup in an air conditioner with aluminum fins. The all-copper heat exchanger on the right shows no mold growth.



## ICA'S WORK IN THE AREA OF HEAT-EXCHANGE SYSTEMS

ALIGNS WITH THESE UN SDGS:

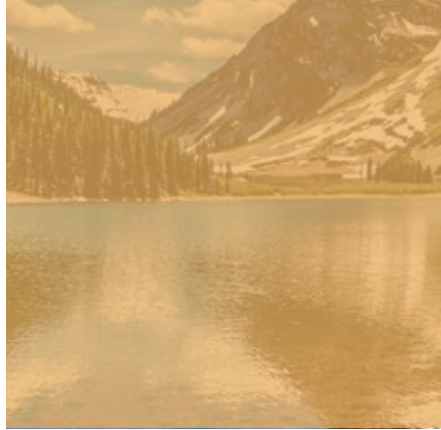
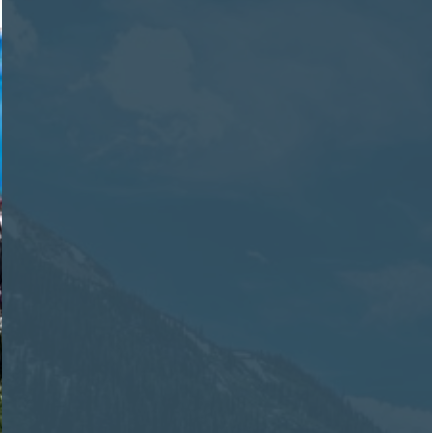


### Partnership Opportunities

ICA seeks partnerships with manufacturers of heat-exchange systems and the products that contain them, as well as universities, R&D facilities, and others that develop new technologies in this area. As noted in the Energy Efficiency section, ICA also seeks to develop and expand partnerships focusing on higher efficiency standards for these and other products.

### UNPRECEDENTED GROWING DEMAND

*FOR AIR CONDITIONERS EXISTS IN THE DEVELOPING WORLD, WHERE ELECTRICITY CONSUMPTION FOR AIR COOLING CONTINUES TO RISE AT ALARMING RATES.*



## COPPER INDUSTRY SUSTAINABLE-DEVELOPMENT INDICATORS

In addition to its positive impact on sustainable development through investments in the International Copper Association, the copper industry's contributions to sustainable development are catalogued through a series of Sustainable-Development (SD) indicators that were first published in 2015.

- On average, the Copper Alliance members surveyed<sup>11</sup>:
  - Provide employment for over 310,000 people
  - Invest nearly \$450 million per year to protect the safety of its employees
  - Feed \$120 billion per year into the global economy, including \$15 billion paid to governments as taxes
  - Invest \$23 billion every year to render its operations more sustainable
  - Emit less than 0.15 percent of the world's total annual CO<sub>2</sub> emissions (ca. 35 billion tonnes CO<sub>2</sub>)
  - Consume around 0.1 percent of the world total annual final energy consumption (ca. 375 billion GJ)
  - Recycle nearly three billion m<sup>3</sup> of water per year
- The majority of ICA's members publish sustainability reports and openly declare their commitment to embracing sustainable-development principles and goals.
- The ICA global website, [sustainablecopper.org](http://sustainablecopper.org), presents an aggregated view of how the industry is performing against a range of well-known sustainable-development indicators like CO<sub>2</sub> emissions, energy intensity or injury rate.
- The copper industry is acting responsibly and transparently by reporting not only on its economic performance but also its social and environmental responsibility.

## THE PUBLISHING AND ONGOING MAINTENANCE OF COPPER INDUSTRY SUSTAINABLE-DEVELOPMENT INDICATORS

*ALIGNS WITH UN SDG 12 AND 16:*



<sup>11</sup> <http://sustainablecopper.org/methodology.html>

## CONCLUSION

The members of ICA continue to make a positive impact on sustainable-development challenges worldwide. Concurrently, ICA will continue to seek partnership with organizations interested in working with us to advance the global sustainable development agenda and to expand programs that will help to ensure continued and consistent progress against the 17 UN Sustainable Development Goals.

This ongoing work would not be possible without the continued support of the members of the International Copper Association:

Anglo American	Mitsubishi Materials Corporation
Antofagasta Plc	Mueller Industries
Aurubis	Nexans
BHP Billiton Plc	Operadora de Minas e Instalaciones Mineras, SA de C.V.
Boliden AB	Outotec Oyj
Chinalco Luoyang	Pan Pacific Copper
Compañía Minera Doña Inez Collahuasi	Revere Copper Products, Inc.
Compañía Minera Zaldívar	Rio Tinto Plc
CODELCO	Sociedad Contractual Minera el Abra
Daechang Co., Ltd.	Sociedad Minera Cerro Verde S.A.A.
Freeport-McMoRan Inc.	Southern Copper Corporation
Glencore	Sumitomo Metal Mining Co., Ltd.
Golden Dragon Precise Copper Tube Group Inc.	Teck
Kennecott Utah Copper Corp.	Tenke Fungurume
KGHM Polska Miedz S.A.	Wieland-Werke AG
KM Europa Metal AG	Yunnan Copper Industry (Group) Co., Ltd.
LS-Nikko Copper Inc.	
Luvata	
Metalurgica de Cobre, S.A. de C.V.	
Minera Antamina S.A.	
Minera Centinela	
Minera Escondida Limitada	
Minera Los Pelambres	

### Additional Resources

[copperalliance.org](http://copperalliance.org)  
[sustainablecopper.org](http://sustainablecopper.org)  
[united4efficiency.org](http://united4efficiency.org)  
[cuaquaculture.org](http://cuaquaculture.org)  
[leonardo-energy.org](http://leonardo-energy.org)  
[thinkcopper.org](http://thinkcopper.org)  
[antimicrobialcopper.org/us](http://antimicrobialcopper.org/us)