



European
Copper Institute
Copper Alliance



2013 Annual Report

European Copper Institute

OUR VISION

Inspiring Europe about copper's essentiality for health, technology and quality of life.

OUR MISSION

The European Copper Institute (ECI), a member of the global Copper Alliance™, represents the copper industry in Europe. Operating with an annual budget of around €16 million, we provide high-quality services to our member companies, we respond to requests from regulators, academia and media, and we support copper users across a broad range of end-use sectors.

Throughout 2013, ECI and its network of national associations, collectively referred to as the Copper Alliance, continued activities to promote and publicise the benefits of copper to society. Pages 10 to 21 describe how copper-based solutions are helping to address today's social, economical and environmental challenges in key markets such as energy and electricity, building construction and healthcare.

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Access the Copper Alliance

Dr. Stefan Boel
Member of the
Executive Board
Aurubis AG



CHAIRMAN'S MESSAGE



Copper, along with other non-ferrous metals, are used in a broad range of applications that provide economic activity and growth in both EU and export markets. The European Commission's objective, of increasing industry's GDP contribution, up to around 20% in 2020, will not be achieved without copper products playing their role in strategic sectors, such as energy distribution, automotive, machinery, electronics and construction. These contribute billions of euros of trade in EU-developed, world-class technologies, products and services.

However, low activity levels in construction markets, a further 1.8% decline in EU car sales, to the lowest annual level since 1995, plus some share loss to aluminium in power cables, continued to challenge the European copper industry in 2013. The recent International Copper Study Group¹ data, indicates EU 28 refined copper usage remained at the depressed 2012 level of 3.1 million tonnes. Global demand reached 21.2 million tonnes, up 4% on 2012.

Based on mining industry investments made 3-5 years ago, global copper production increased around 5%. While the transparency of metal inventories, particularly in China, makes it difficult to establish accurate supply/demand data, at year-end, the main metal exchange inventories had fallen, by 80,000, to around 500,000 tonnes (slightly more than one week's demand). Copper prices continued to trade within a relatively narrow band, with the average 2013 London Metal Exchange price of 7,322 \$/T falling 8% (628 \$/T) versus 2012. These levels, relative to competing materials, continue to present both demand and competitiveness challenges for independent smelter/refiners, semi-fabricators, as well as many copper users along the value chain.

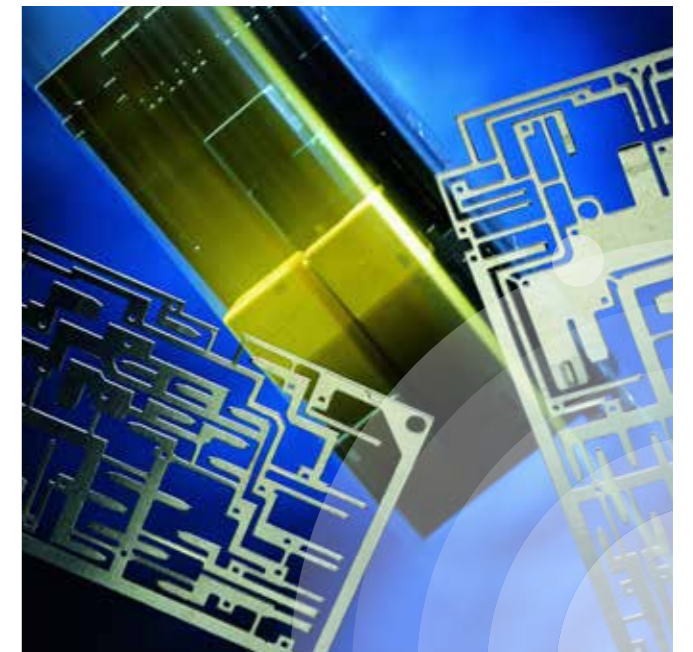
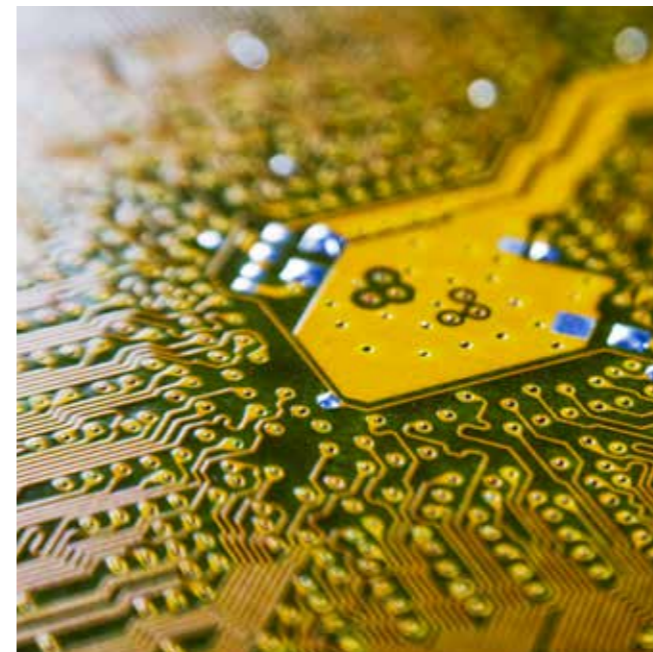
European living standards and expectations make it more expensive to produce here, than in competing regions. However, the ever-increasing EU regulatory burden adds significantly to these costs. The copper industry needs energy and climate change policies that will deliver affordable energy. Any reforms to the Emissions Trading Scheme must address the competitiveness gap faced by European energy-intensive industries and provide full compensation for both direct and indirect emissions, based on actual output.

The implementation of the Industrial Emissions Directive must be based on achievable and realistic performance ranges for all operating plants; the specificities of metals must be recognised pragmatically in REACH implementation; and the setting of environmental and human health quality standards must be based on scientifically correct assessments of risks, not on hazards and the precautionary principle.

The current developments on the classification of lead, plus the lowering of limit values, are of immediate and very high concern. The industry has invested heavily, over many years, either to eliminate lead altogether, or to reduce the levels in finished products to the minimum required to meet end-user performance targets. Current proposals will have serious impacts on recycling (40 - 45% of annual EU copper demand is sourced through recycling), thus raising consumer prices. It will also make it much more difficult for the European copper industry to compete, on the global market, for the raw materials it needs, since they all contain naturally occurring, background levels of lead.

In closing, I would like to thank the International Copper Association and the European copper industry, plus our many project partners, for their continued funding and support. Also, on behalf of the membership, to thank the European Copper Institute and its fellow Copper Alliance members for their many achievements throughout the past year.

¹ The International Copper Study Group (ICSG) is an inter-governmental organisation, based in Lisbon, which publishes copper production and demand statistics. Visit www.icsg.org for more details.





John Schonenberger
Chief Executive
European Copper Institute

John Schonenberger

Achieving the EU's aspirations for job creation, such as encouraging industry to grow its contribution to GDP to 20% by 2020, while at the same time pursuing ambitious climate change and resource efficiency policies, presents real opportunities for building block material industries, such as copper.

CHIEF EXECUTIVE'S MESSAGE

As an integral part of the global Copper Alliance, one of the key roles of the European Copper Institute is to support these aspirations by being a respected, authoritative and commercially neutral source of information, to all key stakeholders, about the multiple benefits provided by copper products.

With close to 70% of annual demand going into applications that generate (e.g. wind turbines and photovoltaics), distribute (wires and cables) or consume (electric motors and HVAC systems) electricity, copper's superior conductivity is essential in efforts to reduce energy demand by improving energy efficiency. ECI is an active member of both the Coalition for Energy Savings and the Energy Efficiency Industrial Forum, both of which are contributing strongly to the current debates on EU energy and climate change policies for 2030 and beyond. Whilst economically viable products and technologies, that can both deliver efficiency gains and create local jobs, are available now, much stronger political leadership and ambition are needed to materialise them.

Our efforts to communicate the public health benefits achievable through the use of Antimicrobial Copper touch surfaces continue to build momentum. In Europe, 4 million healthcare-associated infections cause 40,000 deaths and contribute to a further 110,000. The healthcare-associated costs to society are more than 7 billion €/year. Third-party clinical trials in Intensive Care Units have demonstrated that copper alloy surfaces continuously reduce bacterial contamination (e.g. MRSA), by more than 80% and deliver a 50% reduction in infection rates.

ECI is also committed to communicating on the sustainable development credentials of the copper industry. During the year, we published a first ever position on the long-term availability of copper. We also updated our recycling flow models. Copper is one of the few materials that can be recycled, again and again, without any loss in performance. Doing so requires up to 85% less energy than primary production. Around the world, this saves 100 million MWh of electrical energy and 40 million tonnes of CO₂ annually. Recycling copper is therefore a highly eco-efficient way of reintroducing a valuable material back into the economy.

15 years in the capital of Europe

Back in 1998, industry leaders took the decision to set up the European Copper Institute in Brussels. As an insert to this report, readers will find a list of what we believe have been our most important achievements for each of those fifteen years - not only for our industry members and their customers, but also in support of the EU achieving its objectives.

If you would like to learn more about copper, the benefits to society provided by its products, or the industry's views on current policy and regulatory issues, please visit www.copperalliance.eu.

PARTNERSHIPS & ALLIANCES

By Hans De Keulenaer & Nigel Cotton

Joining forces to create a DSM University

The International Energy Agency Demand Side Management (IEADSM) implementing agreement has worked, for more than 20 years, to support policy makers in implementing solutions, such as load management, energy efficiency and strategic conservation, in national electricity systems. Copper benefits through the increased use of automation technology, the emphasis on energy efficiency and a deeper integration of renewables. At its 41st meeting on April 23-24, the IEADSM's Executive Committee agreed to work with ECI to create a DSM University, targeting policy makers, utilities and energy managers, to accelerate the adoption of DSM solutions.

Renewable energy training for Asia-Pacific regulators

At the request of the Asia Pacific Economic Cooperation (APEC), the Clean Energy Solutions Centre (CESC) and ECI have developed an e-learning program, on renewable energy, for regulators in the Asia Pacific region. The ten-hour program covers the various aspects of renewable energy, from technology selection, through financing mechanisms, to policy-making. ECI and the CESC are providing the production environment and hosting the program, while APEC is providing financing and promotion.

Partnership established between Leonardo ENERGY and IRENA

The International Renewable Energy Agency (IRENA) is an intergovernmental organisation dedicated to promoting the increased adoption and sustainable use of all forms of renewable energy. To help dismantle barriers for market uptake, the Agency has established the IRENA Renewable Energy Learning Partnership (IRELP), a one-stop-shop for renewable energy education and training. After acknowledging ECI's Leonardo ENERGY platform, as a credible educational resource in the renewables field, a new outreach partnership was established, with several tens of Leonardo ENERGY courses now also available through the IRELP portal.

Collaboration continues with the renewable heating and cooling sector

ECI continues to work with the renewable heating and cooling sector, participating in events with the European heating industry and providing support for the renewable heating and cooling platform. We improved visibility for large scale solar thermal installations, highlighted the case for solar hot water use in mining operations, and made contributions to solar thermal technology conferences and workshops.

With the aim to reduce the current use of fossil fuels for hot water preparation, the "Global Solar Water Heating Market

Transformation and Strengthening Initiative", funded by the United Nations Development and Environment Programmes, is working with ECI in both implementing the initiative and developing outreach. In the past year, the project's global knowledge management component has been acknowledged as the leading source of information on solar thermal with references in the International Energy Agency's World Energy Report and in the Renewable Energy Policy Network for the 21st century (REN21) Global Status Report. This facilitates the transfer of information and incentivises the structuring of the solar thermal industry, local capacity building and the establishment of testing facilities.

Solarthermalworld.org reaches out to 100,000 people per year

ECI and solarthermalworld.org, the web portal for the initiative, participated in many political and industry events including Europe's Renewable Energy Conference 2013, the Eufores Inter-Parliamentary Meeting in Dublin. These events bring together policy makers, renewable industry associations, industry and researchers, active in policy-making and market development, to stimulate broader uptake of renewable energy and energy efficiency.

ABOUT OUR MEMBERS

ECI's direct industry members include the EU's top 6 producers of copper, Europe's leading manufacturers of semi-fabricated copper products, and downstream companies exploiting copper's benefits in end-use applications and innovative technologies.

Today, Europe has a relatively small, but efficient, copper mining industry, plus a world-class smelting and refining (copper producing) sector. European companies have, in fact, pioneered many of the metallurgical processing technologies used worldwide. Today, according to CRU, four of the world's ten biggest refined-copper producers have their headquarters in Europe. The EU also boasts a well-established semi-fabricating sector which converts both primary copper and scrap into a broad range of copper and copper alloy products for use further down the value chain.

Innovation, driven by proximity to, and close cooperation with customers, plus the anticipation of market needs, have become the hallmarks of success for Europe's copper semi-fabricating industry. This requires investment in product research and development, plus flexible equipment capable of meeting the highest quality requirements. The sector is made up of fewer than twenty large to medium-sized companies, together with a wide variety of more specialised players, many of whom offer products made of different metals and their alloys.

In total, the European copper industry employs some 50,000 people directly and sustains the jobs of millions of others by delivering key products into a vast range of business and service activities.

See the right side of the page for our member companies that have either assets or operations, employ people and pay taxes in Europe. For a full list of the members of the International Copper Association, visit www.copperalliance.org.

Board of Directors*

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*As of March 1st, 2014



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Outotec



RioTinto



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Wieland

ENERGY AND ELECTRICITY

by Hans De Keulenaer

ECI's program organises and delivers education and advocacy activities across a broad range of energy-related topics. On the education front, we redesigned our Leonardo ENERGY web portal and extended its offering towards energy professionals. The most notable change was the addition of our Leonardo Academy which offers ~500 hours of online e-learning suitable for thousands of energy professionals.

On advocacy, the focus has been on energy efficient products, energy management and renewables. In the context of the EU ecodesign directive, the regulation on transformers, including the setting of Minimum Efficiency Performance Standards, has been drafted by the European Commission. A similar process has started for power cables. ECI supported the Sector Forum for Energy Management in the introduction of the new ISO 50001 standard (management system model of continual improvement) for the European region. Recognising threats from competing materials, increased attention has also been placed on developing value propositions to defend the use of copper as a conductor in electrical applications.

A revamped website for Leonardo ENERGY

ECI redesigned and re-launched its central web platform for education and outreach. As an expert community, made up of 4,000 members and 45,000 registered subscribers from around the world, Leonardo ENERGY is probably the world's #1 online platform linking sustainability messages for copper with the needs of today's energy systems. Its in-depth content, structured in a comprehensive library by key topic, provides broad coverage of technical, environmental, social and economic dimensions. The new website also offers an ideal vehicle for partnerships, as it provides exactly the kind of outreach capability that partner organisations often find useful. There is no better proof than the fact that Leonardo ENERGY's seventy plus partners include a

mix of commercial companies, academic institutions, industry associations and both governmental and non-governmental organisations.

Regulation on transformers enters stage 6 of the ecodesign process

The European Commission issued a draft regulation for small, medium and large power transformers. The inclusion of power transformers, up to 40 MVA, in addition to distribution transformers, makes the EU a pioneer in regulating power transformer efficiency through an act of law. The impacts of the regulation are expected to be a reduction in energy consumption of 20 TWh/year, resulting in emission savings of 10 million tonnes of CO₂ per year and increased copper demand of 25-30,000 tonnes per year. ECI has been pioneering transformer efficiency in Europe since 1998. Its market intelligence has placed the topic on the EU regulatory agenda and it has provided substantial input into the regulatory design process.

New barometer shows the way on electrical safety policy-making

ECI's new Electrical Safety Barometer demonstrates that the safety of residential electrical installations is well below what is reasonably achievable in the majority of countries around the world. The barometer's thirteen criteria and weighting factors, used to determine an overall score for a given country, were endorsed by the International Federation for the Safety of Electricity Users (FISUEL). With the assistance of local experts, ECI applied the barometer in thirteen countries that, in total, represent 60% of the world's population. The results show substantial room for improvement in most. The barometer also provides recommendations to policy makers on how they can improve their situation. The results for France clearly showed that the introduction, 5 years ago, of mandatory, periodic inspections of installations can deliver a step change in safety levels.

The copper potential of such a regulation, used for example in improved wiring, earthing systems and circuit breakers, was calculated at around 16,000 tonnes over five years. The barometer can be accessed at safetybarometer.org.

Expert group assessing increased functionality and flexibility in domestic installations

Leonardo ENERGY has initiated and moderated a series of workshops designed to identify best practices for increasing the functionality and flexibility of domestic electrical installations. As EU energy policies adopt an increasing focus on improving energy efficiency, more investments will be made in building renovation, including insulation, glass replacement and rewiring. For a small incremental investment, the latter offers homeowners the opportunity to install better lighting systems, more power outlets and more flexible communications capabilities. ECI's initiative is clearly answering a pressing need from industry, given the active support received from product and standardisation experts from key market players, associations and educational institutes. Representatives from the Legrand Group, Siemens, ABB, Niko and Abitana shared their expertise with architects and representatives from the construction industry. During 2014, the outputs from the Expert Group will be incorporated into ECI's existing outreach towards the buildings sector.

New conductivity database available for downstream decision-makers

To ensure that engineers and designers have easy access to the most up-to-date conductivity performance data, ECI has published a new database at www.conductivity-app.org. The neutral, academically endorsed figures support all parts of the value chain, from the suppliers

Important progress in developing a copper conductor for overhead transmission lines

ECI commissioned an analysis of the viability of copper conductors for the overhead lines sector, which has, for decades, been dominated by aluminium based conductors. The outcome shows that, while the initial investment for a

By using conductivity-app.org, decision-makers are able to compare copper's performance properties versus those of potential substitute materials.

of alloys, through their customers and down to specifiers in industries such as automotive, electronics and electricity systems. The database, which initially contained only copper alloys, has been expanded to cover Electrolytic-Tough-Pitch copper (ETP), the most common type of copper, plus several non-copper conductivity alloys. As a result, decision-makers are able to compare directly copper's performance properties versus those of potential substitute materials.

copper conductor is higher, compared to a Steel Reinforced Aluminium Conductor (ACSR), its life cycle cost is 10 to 15% lower. The most important advantage, however, is that copper conductors can operate at much higher loads, above their nominal capacity, before reaching their safety limit. Several Transmission System Operators have confirmed this to be of high value since it provides them with more flexibility to deal with shifts in demand, as well as to ensure supply reliability to customers in case another line or power plant drops out. This could save substantial investments in additional infrastructure. Efforts to progress demonstration projects are continuing in 2014.

Wind-powered industrial processes could provide a new 200,000 tonne market for copper

ECI has developed a concept of Renewable Energy powered Industrial Processes and has tested it with industrial companies, primarily in Germany. So far, three companies have assessed the feasibility for their own processes. The potential, just for five industrial processes in the EU, is close to 70 GW, which would require about 200,000 tonnes of copper. ECI is now investigating various financing routes, within the context of the EU's Horizon 2020 program, to develop a demonstration project for this concept.





BUILDING CONSTRUCTION

by Nigel Cotton

On average, activity in the European construction market declined by a further 3% resulting in levels last seen in 2007. The market decline was not evenly spread across Europe. The west European countries most affected by the economic and real estate crisis, plus most of eastern Europe, declined by approx. 7%. On the other hand, modest increases were seen in Norway, Denmark, Austria, Germany, Switzerland and Poland.

ECI's "Copper in the Built Environment" campaign raised end-user awareness that copper products are readily available, durable and continue to offer real value for money. The campaign's benefit messages targeted private and public building owners, along with influencers, through a range of print and online media relations, web-based outreach and events.

As a result of many of Europe's leading mainstream media, plus a variety of trade publications, picking up on the campaign's visual images and emotional messages, we estimate that our efforts resulted in over 350 million "Opportunities to See". Whether used in architecture, in interior design, or in gas, heating and water distribution systems, copper was seen as durable, beautiful and safe – benefits highly relevant for a more sustainable and comfortable living environment.

Activities were carried out by the Copper Alliance in France, Germany, Italy, Poland, Spain and the UK, with supporting activities carried out in Hungary, Benelux, Greece, Scandinavia and Russia.

Copper in Architecture Awards

At a special event, held at the opening of the BATIMAT Exhibition in Paris in November, the winners of the European Copper in Architecture Awards were revealed. This year, the judges focused on how copper can be used in a modern way, while, at the same time, complementing historical and often challenging sites through attention to detail and appreciation for the environment. The Grand Jury Award was presented to the Pitágoras Arquitectos architectural firm for the Platform of Arts and Creativity in Guimarães, Portugal. The architect made use of copper's colour and design flexibility to regenerate the ancient centre of Guimarães, a UNESCO world heritage site, and one of Portugal's most important historical cities. The building helped to transform the centre into a multifunctional marketplace for artistic, economic, cultural and social activities. This year's award featured, for the first time, a public choice poll. The outright winner was the Dolomitenblick apartment building in Italy. The Copper Alliance's

press communications resulted in over 120 articles in the European press (online and print) reaching over 7 million readers. All submitted projects and award winners, plus a short video of the event, can be found on our architectural website copperconcept.org.

Inspiring Europe's architects through the Copper Architecture Forum magazine...

In 2013, ECI published two editions, in both print and electronic formats, of the Copper Architecture Forum magazine. 25,000 copies, covering 13 languages, of this flagship magazine were distributed by industry members and the Copper Alliance to architects and building professionals throughout Europe. Referenced buildings showcased the growing diversity of innovative designs which make the most of copper's incomparable performance capabilities and its sustainability credentials. In response to subscriber feedback, the magazine is now available as an eBook.

Copperconcept.org in numbers

86,317 visits
up 5% on 2012

3,061 reference buildings

1,592 online subscriptions
to the Copper Architecture Forum magazine

132 newsletters sent out to over 7,000 subscribers

... and through www.copperconcept.org

This 17-language website seeks to inspire architects by featuring the best examples of international architecture using copper, or its alloys. The site also hosts an online library of past issues of the Copper Architecture Forum magazine, as well as the Copper in Architecture Awards. To further enhance mobile use, applications for iOS and Android based devices were introduced.

ECI plays a key role in coordinating industry inputs on EU regulatory developments

For the past 15 years, ECI has coordinated the industry's scientific testing and advocacy into issues associated with the use of copper and copper alloy products in drinking water systems. This has resulted in around 20 alloys being included on the positive materials list championed under the "4 Member States" work on materials in contact with drinking water.

In 2013, ECI also became a founding member of Metals for Buildings, an alliance dedicated to promoting, to the European Institutions, the economic, sustainability and recyclability benefits of metals used in buildings.

Copper Alliance members manage well-coordinated national outreach

As part of our market defence and general outreach efforts, the Copper Alliance worked regularly with journalists and other influencers. This generated 476 print articles, with a combined circulation of over 71 million, and 228 online articles, reaching over 185 million readers. In addition, we succeeded in securing 31 print trade press articles, with a circulation of nearly 0.7 million, and 120 online trade articles, reaching over 3.7 million viewers.

During the 4th quarter, one 3-minute and five 45-second promotional spots, focusing on the main applications of copper tubes, were broadcast on DeCasa TV, a Spanish TV channel specialised in home renovation and decoration, with a potential audience of 6.9 million. In Poland, a 60-second bulletin was broadcast, during October to December, on four different TV channels with cumulative outreach of over 6.6 million viewers.

We estimate that, across Europe, national Copper Alliance members organised, or were part of, over 100 separate education events and seminars which attracted, in total, over 100,000 participants. Italy participated in two very important fairs devoted to the building sector: SAIE in Bologna, which featured ECI's "Copper in a box" exhibition and MADE Expo in Milan. Hungary participated in the "Past, present and future of Sanitary Engineering" exhibition which attracted over 44,000 visitors.



ANTIMICROBIAL COPPER

by Angela Vessey

Copper is now recognised as a proven, broad-spectrum antimicrobial material offering great potential to reduce the levels of bacteria in environments where hygiene levels are extremely important. The Copper Alliance focuses on communicating how the use of antimicrobial copper alloy touch surfaces can substantially reduce the risk of patients catching healthcare-associated infections. These remain a major problem, costing money and lives and placing a huge burden on national healthcare services around the world.

Growing the evidence base

New measures introduced into our healthcare systems, via guidelines and policy, need to be carefully reviewed, by appointed healthcare technology bodies, based upon the quality and quantity of published scientific evidence. There are now well over 60 published papers supporting the efficacy of copper against the pathogens that cause healthcare-associated infections. In 2013, a seminal paper was published in a leading infection control journal, the *Infection Control and Hospital Epidemiology (ICHE)*, linking, for the first time, the continuous antimicrobial action of copper touch surfaces with a >50% reduction in infections in patients in intensive care units.

The Copper Alliance disseminated this information widely, via healthcare trade media and infection control events, plus multiple face-to-face meetings with the infection control community, health officials and key opinion leaders who influence health policy. The ICHE paper proved to be a game changer, putting copper firmly on the radar for official healthcare assessments – so called horizon scanning. In the UK, the National Health Service Infection Control guidelines, issued in December, included copper as an emerging technology. It recognised copper's continuous action – reducing bio-burden in the clinical environment – and called for further clinical and economic assessments. The Scottish Healthcare Technology Group has copper on its agenda for review in 2014.

Supporting third-party research

The Copper Alliance continues to support a number of national, third-party research initiatives through the provision of technical support, supply chain liaison and the facilitation of access to copper researchers, e.g. the Medical School of Athens University, Areteion Hospital in Greece, the Hygtech project in Finland and Campden BRI in the UK. These initiatives will further extend the pool of copper experts and, ultimately, the breadth and diversity of the evidence base in support of healthcare, food processing and other markets.

Sharing the evidence

Antimicrobial Copper exhibited at more than 20 events around Europe, including the 2nd WHO International Conference on Prevention and Infection Control in Geneva. This was attended by 1,100 infection control professionals, from 90 countries. The conference program featured five antimicrobial copper research elements, reflecting the growing interest from the scientific organising committee, including an oral session, by Dr. Panos Efstathiou, on the effectiveness of antimicrobial copper in neonatal intensive care units, plus posters on the latest norovirus work, from Professor Keevil at the University of Southampton, and a business case model, showing the economic benefits, from York Health Economics Consortium. Delegate feedback confirmed the model as a credible tool to address misconceptions over the cost of a copper installation. The US trial paper, published in the ICHE, was cited as one of the most significant of the year by one of the ICPIC Scientific Committee members in the "Best Infection Control Paper" session.

Raising copper on the political agenda

A deputy raised a question in the French parliament about how the government was going to investigate the use of antimicrobial copper to reduce healthcare-

associated infections. The Minister of Health answered that she would appoint a committee to carry out an evaluation. The Copper Alliance member in France ensured that the latest scientific evidence and economic assessments were available to inform government advisors. The committee is expected to report on its findings during 2014.

Stimulating supply chain growth

Growing interest and demand from the market is stimulating expansion in the supply chain. The Copper Alliance is

Medical equipment manufacturer interest was extremely high, with requests for Cu+ products and peer pressure reported as key drivers.

supporting semi-fabricator members in their outreach to component manufacturers, through the provision of scientific and technical resources via the Antimicrobial Copper website and by expert staff.

The world's largest medical trade fair, MEDICA in Dusseldorf, was chosen as the vehicle to showcase copper technology and product ranges. An impressive, 54 m² "Copper hospital" stand provided a visual demonstration of more than 50 Antimicrobial Copper healthcare products, supplied by Cu+ partners from around the world. Responding to demand, a new guide to help with the selection of Antimicrobial Copper alloys was developed with input from industry and staff. This will enable users to more quickly select from the >450 approved alloys, as well as to offer guidance on colour, reflecting the high level of interest in silver-coloured alloys. Medical equipment manufacturer interest was extremely high, with requests for Cu+ products and peer pressure reported as key drivers.

Approval of the Antimicrobial Copper Cu+ brand is becoming increasingly important, with 85 licence holders now signed up across Europe. In Poland, Cu+ approval is now a requirement for an increasing number of hospital procurement tenders. There has also been an increase in the emergence of service providers offering to supply and install a broad range of Cu+ products sourced from multiple manufacturers.

Installation numbers are growing

To our knowledge, more than 45 commercial installations have taken place, resulting from the marketing efforts of the Cu+ supply chain. Highlights included nine hospitals (the first one in Cyprus, plus others in Germany, Finland and France), two care homes (in France and Belgium), five doctors' surgeries (in Germany), two research laboratories (in France and Switzerland), and the first installations in a university (Poland) and a private residence (France). In Bulgaria, the vice Minister of Health attended the opening of a copper

confusion about the comparative efficacy of different materials and the superior performance of copper and its alloys. The Copper Alliance is represented on the British Standards Institute panel to develop a new, more appropriate standard and is using peer-reviewed and published work, together with protocols from the United States Environmental Protection Agency, to progress this.

Media

With the adoption of Antimicrobial Copper gaining pace, in healthcare facilities around the world, and an ever-broadening range of products available on the market, the quality and quantity of media stories rose, covering new installations, laboratory and clinical trial results, new products and events. Via high-profile outlets, such as the BBC, TF1 and France2, Germany's WDR, Greece's TV 100, Poland's TVN24 and Spain's La Sexta, news items reached an audience in excess of 315 million. Notably, Antimicrobial Copper is also being mentioned increasingly in non-healthcare contexts, such as kitchen design and transportation, demonstrating an increased general awareness of copper's hygienic qualities.

isolation room at Tokuda Hospital in Sofia. Supported by modest grants from the Copper Alliance, three trial installations were completed – a mother and childcare institution in Greece, a dental practice in the Netherlands and a hospital IT suite in Finland. All of these installations demonstrate the growing acceptance of the value proposition for Antimicrobial Copper matched by the growing availability of products. The growing and diverse portfolio of installations also serves to both inspire and reassure new decision-makers and specifiers.

Norovirus story opens new markets

While healthcare facilities (hospitals and long-term care services) remain the focus of the Copper Alliance's efforts, there are many other applications/markets where Antimicrobial Copper products can provide benefits. Last year saw the publication of the first paper reporting copper's efficacy against norovirus, responsible for 267 million cases of acute gastroenteritis every year worldwide, and which has no specific treatment or vaccine. While this virus is problematic in healthcare settings, it is also a major issue in the cruise industry, and the publication of the paper opened dialogue with this high-profile and expanding sector.

Standardisation

The current efficacy standard for antimicrobial materials is increasingly recognised as inadequate and irrelevant for hospital touch surfaces, since it is not conducted under typical indoor ambient air conditions. This has led to market



TECHNICAL MARKET SUPPORT

by Anton Klassert and Angela Vessey

For nearly 90 years, Copper Alliance experts, particularly in Germany and the UK, have provided commercially neutral technical support to the industrial value chain. The UK focuses on marine and offshore applications, while Germany provides contract engineering and consultancy, educational seminars and coordination of mostly government funded copper-related research.

Alloys are the second most important application for copper. Incorporating a variety of other elements, from as low as 0.1 and up to more than 40 percent, dramatically expands product performance in areas such as corrosion resistance, mechanical strength and high temperature stability. This enables copper products to serve a broad range of end-user needs, such as fuel efficiency and safety elements in automotive, corrosion resistance in offshore construction and antimicrobial touch surfaces.

Expanding our technical services

While a large part of our activities remains free to all end-users, Germany has responded to market needs by expanding its paid seminar program and its customer-specific engineering and consultancy services. 2013 saw strong growth in both.

Around 80 percent of seminar participants came from non-member companies, such as ABB, Bosch, VW and Siemens, as well as from small and mid-sized companies involved in very specific applications for copper and copper alloys. For the first time, seminars are being held for individual companies. This combines the benefits of no travel time with the possibility to discuss confidential company issues.

We have already been awarded a handful of proprietary, contract engineering and consultancy projects and were particularly proud of the listing of the Copper Alliance member in Germany (the Deutsches Kupferinstitut) as a recognised supplier on the online purchasing platform of the VW/Audi group. So far, projects have ranged from new product developments through to production optimisation and loss prevention.

Stimulating application focused copper research

The use of "seed money", from the Copper Alliance's Technology Initiative, enabled us to be granted much larger amounts of research funding, mostly from German Federal Government agencies. Topics have ranged from fundamental research, with \$400,000 from the German and Swiss governments, for copper alloy surface research at the Universities of Saarbruecken and Bern, to making progress in high-tech soldering processes at the Technical University of Dresden, to application focused data collection.

One example of the latter is a project, at the Technical University of Aachen, on the machining of new, reduced lead and lead-free copper alloys. The industry has already done a lot, both voluntarily as well as in response to European regulatory efforts, to lower the lead levels in its products. However, most substitute materials are either more costly to produce, resulting in slower processing speeds in downstream industries, and/or require very long and expensive approval testing (e.g. for precision parts in vehicle braking and fuel efficiency systems).

Increasing interest for copper in offshore applications

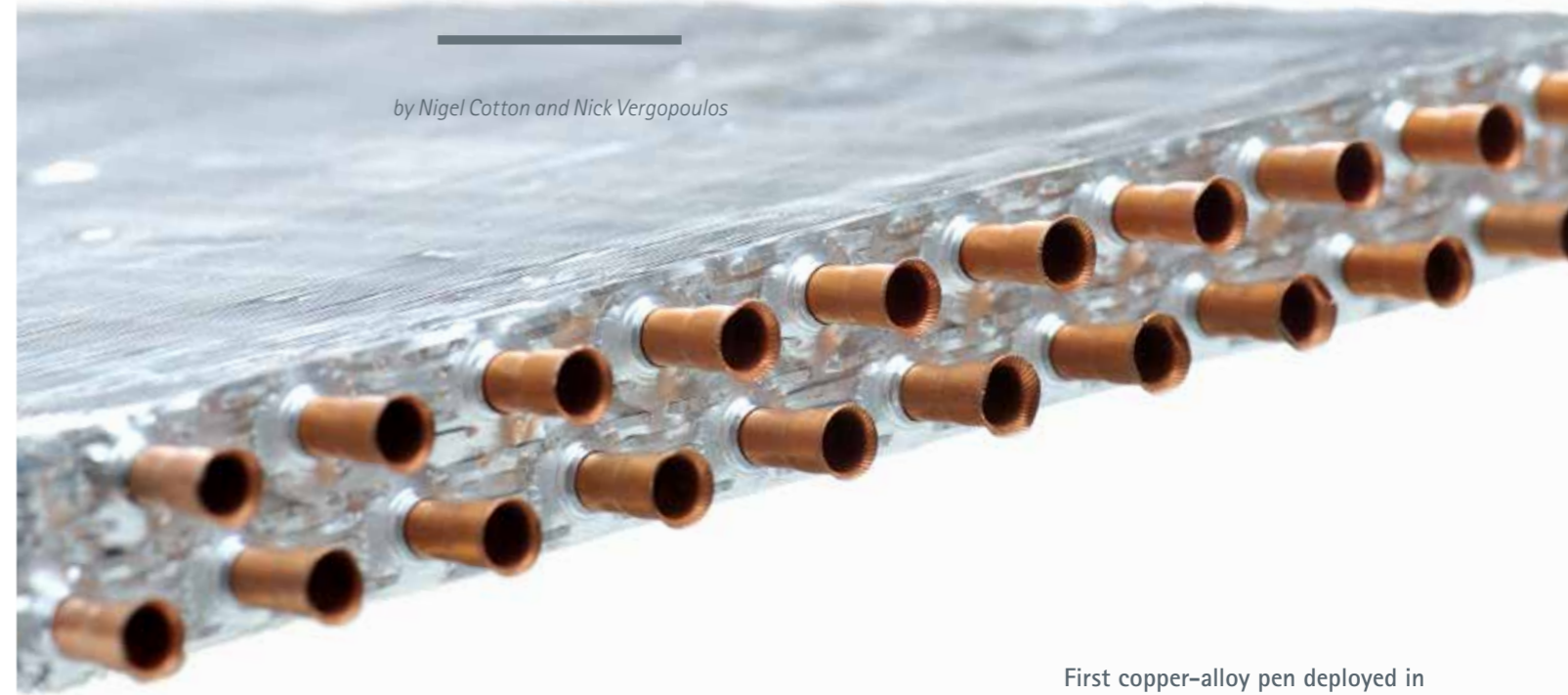
In the offshore sector, which, for example, covers oil and gas platforms, ship building and wind turbine landing stages, the corrosion resistance of copper-nickel alloys offers a unique profile of properties to meet the demanding needs of this sector.

One typical application is corrosion protection in the docking area used by supply and maintenance boats. In a process developed by an ECI member company, steel pipes are protected with a 5 mm outer layer of copper-nickel. The steel provides the required strength, at a lower cost, while the copper-nickel provides the surface protection and high resistance to biofouling. Coatings fail, in this area, as a result of impacts from support boats docking to the structure.

In partnership with the Nickel Institute, the UK exhibited at Offshore Wind in Manchester. The event was a great success, with an eye-catching, 1.8 tonne copper-nickel prototype boat landing stage drawing a steady stream of visitors. In-depth discussions confirmed a real interest in finding a solution to corrosion and biofouling problems, even if it means a higher capital expenditure. Two offers were received for in-situ trials.

TECHNOLOGY AND INNOVATION

by Nigel Cotton and Nick Vergopoulos



As the Heating, Ventilation, and Air Conditioning (HVAC) market grapples with the challenges of delivering cooling in a sustainable way, pressure on resource efficiency, energy performance and refrigerant choice is driving change. MicroGroove™ technology involves the use of smaller diameter copper tubes to improve the overall performance of heat exchangers. Key benefits include smaller size units, lower refrigerant charges, the ability to withstand the higher pressures, associated with more environmentally friendly refrigerants, and lower electricity consumption. 2013 saw MicroGroove technology promoted as viable for large, commercial-size heat exchangers through a series of placements in mainstream HVAC journals, seminars, and features in the "In the Spotlight" section of the MicroGroove Update (MGU) newsletter.

Attendance at the Technology Theater, at AHR Expo 2013 in Dallas, was a watershed event for MicroGroove technology, with members and downstream users actively engaged in spreading the message. Follow-up coverage was made in MGU Issue 2013-2, along with pre-show coverage of China Refrigeration, where MicroGroove also exhibited. In June, MicroGroove held a webinar, which resulted in more than 500 highly qualified leads, describing the design and construction of large, commercial-size heat exchangers.

MGU Issue 2013-2 also included coverage of SPIROTECH, an Indian coil maker that opened a MicroGroove Coil production plant. SPIROTECH is a partner with CanCoil, a respected Canadian coil manufacturer, who exhibited a commercial-size MicroGroove condenser at AHR Expo in New York.

To encourage take up by decision-makers, technical papers were delivered by the Copper Alliance in China, at the conference on the Thermo-physical Properties and Transfer Processes of Refrigerants, as well as a paper delivered at the ATMOsphere America conference held in Washington DC. At ATMOsphere America, the US refrigeration industry confirmed the trends towards propane, CO₂ and other natural refrigerants, in next generation equipment. The LU-VE Group, well respected around the world for its technical leadership in heat exchanger design, now offers a whole line of condenser products (NanoGiant) made with MicroGroove tubes.

First copper-alloy pen deployed in Mediterranean Sea

The Copper Alliance and Proteus, an aquaculture solutions provider, installed a trial pen, manufactured from 20 mm copper-alloy mesh, in the Mediterranean Sea near Palairos, Greece. The pen was deployed in an existing Nireus farm and stocked with 6,000 sea bream (*Sparus aurata*). In May, a storm, with strong winds, caused a nylon net, deployed at the same location and stocked with the same number of fish, to lose its volume and require repairs. The copper pen showed no signs of deformation in volume and the fish were successfully harvested in December. The results from the one-year trial showed that the fish in the copper cage had better growth and fewer mortalities than those harvested from the nylon pen.

Sea Bream are increasingly popular in Greece, Turkey and Spain. However, they are known for their sharp teeth and constant net biting. In addition, fouling is a major concern for fish farmers in the Mediterranean. Today, farmers coat traditional netting with anti-fouling materials and have to regularly clean the nets, while they are in the water, causing debris to be set adrift. The trial pen is now being used for water quality research, conducted by the Hellenic Marine Institute, including bottom sampling and fish-flesh studies.



ECI continues to act on a wide variety of regulatory issues impacting both the copper industry as well as market access for its products. ECI's latest positions on key EU policies can be found at www.copperalliance.eu/policy. An overview of the most important current issues is provided on the next two pages.

HEALTH, ENVIRONMENT AND SUSTAINABLE DEVELOPMENT

by Katrien Delbeke, Katia Lacasse and Laia Perez Simbor

Lead restrictions and classification

To reduce the risk of neurological effects in small children, the Swedish National Chemicals Inspectorate proposed to limit the levels of lead in consumer products to a maximum of 0.05 wt%. During the public consultation period, ECI submitted a detailed representation, covering socio-economic information and test results on lead migration into saliva. This proposed to limit the restriction, to articles that can be mouthed by children, to provide an exemption for leaded brasses (0.5 wt% max) and to grant exemptions for articles, such as keys, padlocks and parts of writing instruments, where no performance substitute for lead has been identified. The European Chemicals Agency has incorporated ECI's saliva data into its latest proposal. A final agreement on eventual restrictions is expected during 2014.

In parallel, ECHA's Risk Assessment Committee has proposed, to the European Commission, that lead metal be classified

as a Category 1A reproductive toxicant and that, for potency purposes, all materials containing lead, above a Specific Concentration Limit of 0.03 wt%, also require classification. ECI's socio-economic analyses, submitted during public consultation, demonstrate the multi-billion €/year cost impacts of this on copper production and on the downstream copper and alloy semi-fabricating industries. Impacts would occur in the handling of raw materials, the use and disposal of smelter slags, the substitution of lead in alloys, down to below "lead-free" levels, and in disruptions to the EU's scrap/recycling markets. Discussions with the Commission, at the broader level of Eurometaux, are ongoing.

New end-of-waste criteria expected to boost copper recycling in Europe

A new regulation, which establishes criteria determining when copper scrap ceases to be waste, came into effect on January 1st, 2014. This follows the adoption of criteria for scrap iron, steel

and aluminium. The main criterion for copper and copper-alloy scrap, to exit the waste regime, is for the content of foreign material to be below 2% by weight. The material must also not contain excessive metal oxides, radioactive contaminants, or combustible materials and must be free from visible oil and oily emulsions. ECI advocated the 2% limit since it will reduce scrap exports from the EU. From a net trade of zero, 10 years ago, copper scrap exports have risen to +/- 800,000 tonnes per year. This is not only a loss of valuable raw materials, it is also an export of energy, since the final recycling of copper uses only 20% of that required for primary (mine) production. Such high-quality scrap can be recycled directly (via simple re-melting) by the producers of semi-fabricated copper products.

Limit value for copper in contact with food set at 4 mg/kg

The Council of Europe published the first edition of its practical guide, for manufacturers and regulators,

on "*Metals and alloys used in food contact materials and articles*". Following three years of advocacy, ECI succeeded in having the limit values for copper fully aligned with those contained in ECI's 2008 Voluntary Risk Assessment. While food contact is not a large semi-fabricated products market, the guide's 4 mg/kg limit value for copper is well aligned with the accepted EU standard for copper in drinking water. For more than 10 years, this has been the same as the World Health Organisation's safe daily limit of 2 mg Cu/l (corresponding to 2 mg/kg).

ECI accepted as stakeholder in new Product Environmental Footprint pilots

European Commission surveys indicate that 48% of consumers are confused by so called "*green marketing*". To overcome the issue, it called for volunteers to test a new, life cycle based methodology on which to make comparative Product Environmental Footprints (PEF) for B2B and B2C products. Supported by three member companies, who have agreed to provide proprietary data to the Commission, ECI has been accepted into the technical secretariats of the pilots for "*Metals Sheets*" and "*Hot and Cold Water supply pipes*". ECI's contributions will focus on ensuring that the specificities of metals, such as their recyclability, are appropriately taken into account and that, for pipes, a system, rather than a simple product, perspective is considered.

ECI provided coordinated industry inputs into the BREF/Industrial Emissions Directive

ECI assisted the industry in submitting the copper chapter of the non-ferrous metals' Best Available Techniques (BAT) REference (BREF) document. The European Bureau for Integrated Pollution Prevention and Control (IPPCB) issued a revised version of the reference report for future plant permits in the EU. While this new draft

included major inputs, made by ECI and the copper industry, it also includes a proposal concluding on BAT and defining Associated Emission Limits. The expert review by industry, the EU Member States and the IPPC bureau will conclude in spring 2014, with the resulting political debates requiring finalisation before year end. The newly set emission limits are binding under the Industrial Emission Directive (IED), leaving companies with a maximum of four years, from the date of publication, to adapt their installations and update their permits.

ECI remains very active in REACH and other chemicals management issues

The European Scientific Committee on Occupational Exposure Limits (SCOEL) has proposed an Occupational Exposure Limit (OEL) of 0.01 mg/m³ respirable copper. This value, which is ten times lower than the current OEL value in Europe, would have extremely serious consequences on all copper processing plants. In cooperation with the REACH Copper Compounds Consortium, plus a group of independent experts, ECI submitted a scientific rebuttal to many of the SCOEL conclusions and has requested an opportunity to present its arguments.

Through its role as Secretariat of the REACH Copper Consortium, ECI provided support, via Letters of Access, to Substance Information Exchange Forum (SIEF) members who registered prior to the May 2013 deadline for the 100 – 1,000 tonnage band. Under the umbrella of the official stakeholder observer, Eurometaux, ECI experts continued to engage with the European Chemicals Agency (ECHA) on the adaptation of copper intermediates classifications, responding to ECHA's annotations to certain Strictly Controlled Conditions dossiers, as well as on issues related to substance identity and methodologies for the risk assessment of chemical substances of "Unknown or

Variable compositions, Complex reaction products and Biological materials", known as UVCBs.

The Consortium's members also agreed changes to the agreement to allow Consortium outputs to be used for chemicals management purposes beyond EU REACH. As one direct consequence, ECI has committed to submit, during 2014, effects dossiers for copper metal and four copper compounds for review under the Organisation for Economic Cooperation and Development's Cooperative Chemicals Assessment program. This should lead to efficiencies, for both regulators and industrial companies, as an approved, global data platform is available for use in national regulations.

Industry competitiveness seriously threatened by EU energy and climate change policies

Due to the price discovery processes provided by global commodity exchanges, such as the London Metal Exchange, copper producers are unable to pass on any cost premia resulting from EU energy and climate policies. It is therefore critical that copper retains its inclusion on the Emissions Trading Scheme's (ETS) carbon leakage list, thus making producers eligible to receive free allowances. Following the Commission's indication that the methodology for the 2015-2019 list could change, ECI updated its trade intensity data and is ready to defend copper's case in, again, qualifying for the list. ECI is also contributing to the debate, under the umbrella of Eurometaux, emphasising copper's role in providing solutions for a more sustainable, low-carbon society. Industry's core request is for policy makers to reconcile the EU's Energy and Climate change goals with its objective to increase industry's contribution to 20% of GDP by 2020. The competitive future of Europe's energy-intensive building block industries, such as copper, needs to be at the forefront when finalising 2030 policies.



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COMMUNICATIONS

by Irina Dumitrescu

Our main priorities in 2013 were to bring copper's versatility closer to peoples' hearts, its capabilities into the hands of professionals and its benefits into the policies of regulators. We completed a major consolidation and upgrade of our web outreach across Europe. This resulted in the launch of a new, pan-European web platform, in 12 countries, which supported the promotion of our main events – the European Copper in Architecture Awards and the International Copper and the Home Competition.

One click for copper in Europe: copperalliance.eu

In September, we launched a new, comprehensive web platform to address the needs of multiple stakeholders, including copper users, professionals, journalists, students and policy makers. The website contains the latest information on the uses of copper and its alloys, along with the benefits provided in the main areas of application. It also showcases the efforts of the European copper industry to strengthen the sustainability of its operations and products. Available in twelve different language chapters, the new website broadens the visibility and strengthens the consistency of copper's messages to audiences across Europe. Our overall aim is to provide relevant information, in a transparent and commercially-neutral way, to help our target audiences make well-informed decisions. While the new website will contain regular updates on products and markets, we certainly encourage users to provide input of what other topics should be covered.

"The stuff that dreams are made of"

ECI responded to the European Commission's invitation to participate in the launch event of the Raw Materials University Day, at Sapienza University in Rome. This was opened by the European Commissioner, Vice-President Antonio Tajani, in the presence of guests from research, industry, academia and public administration. This initiative, organised in the framework of the European Innovation Partnership on Raw Materials, aims to promote sectorial competitiveness, sustainable growth and employment by showing the huge potential of European raw materials. ECI and the Copper Alliance member in Italy presented at the event and, by hosting an exhibition, demonstrated that copper's performance, durability and versatility result in it being one of the most important materials at the heart of innovation and the EU economy.

The International "Copper and the Home" Competition launched

The Copper Alliance also launched the 5th edition of the above. This was created to demonstrate the endless expressive potential of copper, in innovative and unconventional ways, and was aimed at two distinct categories: designers and professional architects, plus students enrolled in schools and universities for graphics, decoration, design and architecture. Increasingly recognised internationally and, today, under the patronage of the Association for Industrial Design, the competition has achieved significant success, more than tripling the number of entries in the past 5 years. The public relations outreach for the 2012 awards provided 20 million opportunities to view in media around the globe.

"Copper in a Box" shown in Milan, London and Lodz

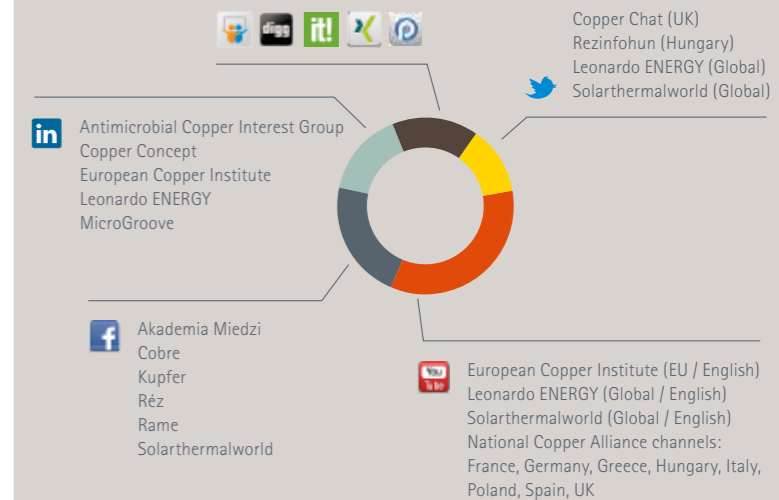
The travelling, Copper in a Box exhibition continued to enchant designers and the public, in January, at the Triennale Design Museum in Milan for the Copper and the Home awards ceremony, in September, at the Ecobygg fair in Stockholm, and, as part of London Design Week in October, underscoring the growing importance of copper in contemporary design. The exhibition finished the year in Poland at the Lodz Design Festival. The exhibition has grown in size, with the addition of objects

by famous designers, such as Tom Dixon, Voon Wong Et Benson Saw, Ilse Crawford and Ingo Maurer.

Copper brings new technologies to life

The copper industry's ongoing research and testing of new concepts deliver a steady stream of innovations that can dramatically transform how things are made and how they work. These innovations may make processes more cost-efficient, minimise their environmental impact, lower their energy consumption, or reduce their use of precious natural resources. We captured these features in our latest video campaign, "Innovating with Copper", developed in collaboration with our fabricator members, to demonstrate the role that copper products play in key societal needs such as renewable energy, healthcare, more energy efficient transportation and modern communications. Such innovations are critical to support the European Commission's goal of re-establishing industry as the provider of 20% of Europe's GDP by 2020. The campaign reveals the multitude of ways in which copper products provide added value to our industries and our lives. By delivering safe electricity and water, eliminating harmful bacteria, and enabling the continued development of electric and electronic devices, copper has never been more important to our society.

Social Media Channels in Europe 2013



In order to engage with the copper users in different geographies and languages, we increased our presence on social media channels, by nurturing LinkedIn groups, YouTube channels, Twitter accounts and creating new Facebook fan pages.



Country	Press Releases	Opportunities to View (in Millions)
Brussels / EU	11	49
France	13	139
CEE (Hungary, Czech Rep, Slovakia, Romania)	53	1
Spain	34	15
Germany	49	142
Greece	20	33
UK and Ireland	40	125
Poland	16	9
Italy	11	42
Total Europe	251	551

Copper's benefits in design, architecture, healthcare, along with its recycling and environmental benefits, were the most covered topics in the mainstream media and trade press in 2013.

FACTS & FIGURES

by Catherine Mantell

Throughout 2013, the Copper Alliance in Europe, i.e. ECI plus its network of ten national Copper Development Associations, operated with a budget of \$21.6 M (16 M€) to develop and carry out promotional and regulatory affairs activities.

In addition, European resources within the Copper Alliance managed a \$1.2 M budget for projects targeted at positively impacting the global demand for copper.

The International Copper Association, representing the world's leading mining companies, independent smelter/refiners and semi-fabricators, provided 61% of the annual budget.

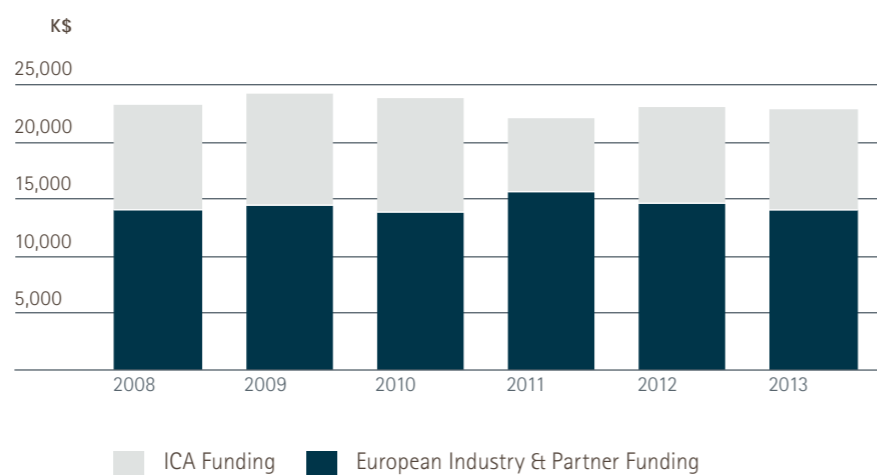
Over 100 partners, both academic institutions and industrial companies, continue to provide strong support for ECI's Leonardo ENERGY program, which broadly promotes the sustainable generation, distribution and use of electrical energy.

Other key projects, supported by significant funding from partners outside the industry, were:

- A partnership with the Economic Community of West-African States, worth \$0.9 M/year from 2012 through 2014, to support the setting of technical standards and advocacy on energy efficiency;
- The second, worth \$3 M/year from 2012 through 2014, with the Clean Energy Solutions Centre, a joint initiative of the United Nations and the Clean Energy Ministerial, to promote policies and programs that encourage the transition to a global clean energy economy;
- The third, worth \$0.7 M, with FISUEL, the International Federation for the Safety of Electricity Users, to raise awareness of the positive impacts that mandatory inspections of residential electrical installations have on reducing fires, deaths and injuries;
- The fourth, worth \$0.9 M, was the final part of the United Nations five-year grant to promote the use of solar thermal technologies in six countries around the world.

(K\$)	ICA Funding	European Industry & Partner Funding	Total
Strategic Initiative			
Building Construction	\$4,300	\$2,600	\$6,900
Electricity & Energy	\$3,800	\$4,500	\$8,300
Technology & Innovation	\$1,200	\$300	\$1,500
Antimicrobial Copper	\$1,300	\$300	\$1,600
Health, Environment & Regulatory Affairs	\$800	\$400	\$1,200
Communications	\$1,200	\$200	\$1,400
Administration	\$1,400	\$500	\$1,900
Total Funds	\$14,000	\$8,800	\$22,800

European Promotion Funds 2008-2013



ACCESS THE COPPER ALLIANCE

ECI is a member of the Copper Alliance™, an international network of trade associations, whose common mission is to work with their respective members to defend and grow markets for copper, based on its superior technical performance and contributions to a higher quality of life.

In Europe, ECI works with a network of nine national associations, some of which have over 80 years' experience in promoting and defending the many uses of copper. The value of our services, to our members and to the market, is built on the skills, expertise and cultural diversity of our people. Through our offices, we employ a mix of forty five professionals from many different disciplines.

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