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EUROPEAN
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EUROPEAN COPPER INSTITUTE

ANNUAL
REPORT
1999



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The European Copper Institute ("ECI") is a joint venture between ICA (International Copper Association) and IWCC's (International Wrought Copper Council) contributing members.

A FEW WORDS ABOUT ECI

Through its membership, ECI acts on behalf of the world's largest copper producers and Europe's leading fabricators in promoting copper in Europe.

Formed in January 1996, ECI is supported by a network of ten Copper Development Associations ("CDAs") in Benelux, France, Germany, Greece, Hungary, Italy, Poland, Scandinavia, Spain and the UK.

It furthers the efforts initially undertaken by the Copper Products Development Association, formed in 1959, and INCRA (International Copper Research Association) formed in 1961.



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ECI is an industry partnership committed to the expansion and support of copper's end-use markets in Europe.

ECI'S MISSION

ECI sets the strategy, arranges funding for, and implements market promotion initiatives undertaken on a collective industry basis at European and national level.

It will sustain a European infrastructure for the effective implementation of its promotional plan.

ECI will undertake to strengthen public awareness of copper's value to society and its role in the environment, based on scientific research.

ECI BOARD AND STAFF

Board

Chairman	Karl-Axel Waplan	Boliden AB
Vice Chairman	Norbert Brodersen	KM Europa Metal AG
Members	Juan Herrera Hans-Peter Holzer Seppo Kreula Art Miele Evangelos Moustakas Barry Pointon Jim Squire Vaughan Williams	Codelco Chile Wieland-Werke AG Outokumpu Copper Products Oy Phelps Dodge Corporation Halcor SA IMI Plc Rio Tinto Plc BHP Minerals Europe Ltd
Alternates	Gonzalo Cuadra Salvatore Orlando Eski Pirttijärvi Peter Wüstum	Codelco Services Ltd Europa Metalli spa Outokumpu Italia SRL Wieland-Werke AG
Treasurer	Bruno Lavallo	Union Minière
Ex Officio	Jan Smolders Simon Payton	ICA President IWCC Secretary General
Secretary	John Schonenberger	ECI Chief Executive

Staff

Chief Executive	John Schonenberger
Executive Assistant	Sally Schofield
Building & Construction Manager	Roch Lemercier
Electric & Electronic Manager	Hans De Keulenaer
Environment Manager	Katrien Delbeke
Communications Manager	Isabelle Adam
Assistant to the Managers	Claudia Reeves
Finance and Administration Manager	Tony Rayne
Administrative Assistant	Catherine Mantell

ECI's progressive shift towards better integrated activities brought significant results in 1999. While the promotional programmes boasted an increase of focus on innovative applications, the Environment and Communications programmes started providing industry with more effective tools for increasing awareness on copper's benefits.

ECI started positioning itself as an authoritative voice on copper at a European level, both with the institutions - by working closely with EMCI (Eurométaux Copper Industry) - and with consumer industries by suggesting novel joint activities.

CHAIRMAN'S MESSAGE

To illustrate the latter, ECI's Electric and Electronics programme successfully initiated and launched a pan-European study on high-efficiency transformers and their potential for significantly reducing greenhouse gases. The research was conducted in collaboration with several transformer manufacturers and benefited from extensive funding from the European Commission. As a result, ECI is now considered as a significant partner in the whole debate surrounding the reduction of CO₂ emissions.

This and other initiatives are also helping the European industry to better position itself in the context of sustainable development.

However, 1999 has not only been about consolidating successes in Western Europe. In line with the ECI Board's strategic objectives, particular efforts have been made to strengthen a copper position in Central and Eastern Europe. While activities undertaken by the two copper centres that currently act at local level were stepped up, plans were made to establish an ECI presence in Russia. Come 2000, ECI will have a representative office in Moscow, which will allow a wider scope for action in former USSR countries.

Building on from relative successes in the regulatory arena, the industry took a significant decision to further increase effectiveness of its lobbying activities through the merger of the former EMCI into the ECI structure. This merger, that will take full effect in 2000, will enable the members of ECI to strengthen the impact of their key messages to the EU authorities.

I am proud to be part of the ECI family as we go through these exciting changes and congratulate the industry for its renewed support and investment to have a strong European association.



Karl-Axel Waplan (VP Marketing & Sales, Boliden SA)

The European Copper Institute continued to evolve its programmes and organisational approach in support of market growth during 1999.

At 4.3 million tonnes, Europe remains the second largest geographic consumer (after Asia) of refined copper in the world. While industry statistics report no increase in this value, versus 1998, this does reflect the success of the strong defence of more traditional markets, such as plumbing and roofing, against environmental and substitution threats, particularly from plastics.

NOTE FROM THE CHIEF EXECUTIVE

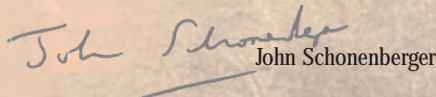
During 1999, the activities of the key European Copper Plumbing Promotion Campaign were reorganised to increase effectiveness and promote further sharing of best practices across the national

campaigns. While promotional activities continued to target the key audience of plumbers, additional emphasis was put on wholesalers and homeowners.

In the Electric and Electronics area, significant effort was put into the setting up of industry partnerships to address the issues of energy efficiency and power quality. In recognition, significant co-funding was received from the European Commission to complete and publish a study on high efficiency transformers.

Maintaining an effective awareness and response activity in the increasingly complex arena of environmental legislation, both at European and national level, remains a major focus area for the Communications and Environment functions. The merger, into ECI, of the European Copper Group's environmental activities will increase the effectiveness of the industry's efforts in this important area.

Networking with ICA, the national CDAs, Eurometaux and the National Federations remains critical to the value of our promotional and lobbying activities. Opportunities to further enhance the current industry's processes will be pursued in 2000.



John Schonenberger

Concern over “sustainable development” arose from the realization that a planetary increase in production and consumption to meet the expected several fold increase in demand was simply unsustainable.

The 1992 United Nations Conference on Environment and Development (UNCED), like the Report of the World Commission on Environment and Development (The Brundtland Report) before it, made it clear that we can no longer consider

environment, economic and social development policy objectives separately.

COPPER AND SUSTAINABILITY

The Rio Declaration suggests that environmentally compatible economic

development will only occur if countries establish a genuine and continuously supportive, co-operative and equitable global partnership involving governments, their people and key sectors of societies and industries to implement agreements which better respect the integrity of our natural environment. Agenda 21 points out that the only way to achieve this is to address environment and development concerns at the same time, noting that economic policies of individual countries and international economic relations both have great relevance to sustainable development.

In the context of the ongoing debates between the trade community and the environmental community, the relevance of the messages from Brundtland and Rio is that sustainable development should become a common objective - a necessary common frame of reference which can be used to analyse the issues and evaluate policy. While the expression ‘sustainable development’ may still be unclear, it forces a broadening of perspectives: trade policy-makers must be concerned about environmental impacts, makers of environmental policy must be concerned about trade impacts, and both must question the consequences of their policies on impoverishment and equity, within and between nations. In a world characterised by growing economic and environmental interdependence, such a global perspective is essential.

For a number of years, the European copper industry has endeavoured to integrate environmental policy into its activities. In 1998, when the European Copper Institute moved to Brussels, a new European environment programme was launched to complement the EHS (Environment, Health and Safety) activities undertaken by the International Copper Association.

From then on, promotional programmes designed under the existing product-related campaigns – the European Copper Plumbing Promotion Campaign (ECPPC), the European Copper Roofing Campaign (ECRC) and the Electric & Electronic Campaign – have included environmental considerations.

It is our purpose, in this report, to present how the activities undertaken by ECI in 1999 fit into the general context of sustainability. We strongly believe copper plays a vital role in today’s society and will no doubt have an even greater part to play in the future. It has been tried and tested for thousands of years. It is both incredibly durable and eminently recyclable.

In addition, it is a trace element, essential to the development and welfare of all life forms.

Rather than present a programme by programme account of activities per se, we have tried to show how, through more streamlined activities, we are acting to promote copper and copper products in an environmentally responsible manner, playing our part for sustainable growth.

COPPER AND THE ENVIRONMENT



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The industry invests considerably in research on copper's interaction with health and the environment. How is this research conducted, and by whom?

For a number of years the International Copper Association (ICA) has been sponsoring research on copper's interaction with the environment and human health. The research programme is based on priorities outlined by ICA members in view of the evolving regulatory environment, and is carried out by independent scientists. Moreover, the findings are peer-reviewed at an international level.

When the European Copper Institute (ECI) moved to Brussels a couple of years ago, it was agreed that it would provide ICA with the European research perspective, and, where necessary, propose activities directly related to EU human health and environmental concerns.

Indeed, whereas in most cases fundamental research knows no geographical limits, different regulatory environments may require different research needs.

In the EU, our main aim has been to sustain a dialogue with the European and national authorities on the current and proposed methodologies used to regulate copper. Often, copper is considered in the same way as organics. Slowly but surely, we are helping authorities realise that this is not a scientifically viable position, especially given copper's role as a naturally occurring essential nutrient.

Who takes the initiative for new research or participation in scientific debates on specific issues?

European environmental and human health regulations are evaluated and prioritised by the European Environment Committee, a joint venture between ECI and EMCI (Eurométaux Copper Industry). For each new issue, a small task force is designated and set-up by the Environment Committee. This task-force is responsible for following up the issue, analysing the available scientific evidence – in co-operation with ICA – and formulating a scientifically sound position. Contacts and active participation in the regulatory debate at the level of the European Commission are co-ordinated through Eurométaux (EM), the European federation for non-ferrous metals. ECI and industry representatives (e.g. members of the International Wrought Copper Council - IWCC) take part in specific regulatory discussions, as determined with EM.

The EU regulations are the main drivers for research proposals and prioritisation. European data gaps and research needs are identified by ECI, ICA, the CDAs and industry members. These identified research needs are discussed and prioritised by the European Environment Committee. The prioritised EU research needs are then forwarded to ICA, which integrates research proposals world-wide and confirms funding allocation.



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The research programme, both at international and European level, is therefore defined in collaboration with our industry members and triggered by regulatory developments. For instance, in Germany, the Deutsches Kupfer Institut (DKI) is working with the national regulators on research concerning copper in drinking water. This is directly linked to the implementation of the EU Drinking Water Directive.

Research can also be triggered by methodological concerns as described above. In

this respect, ECI and its partners are looking at research protocols on surface water criteria.

One should also bear in mind that industry is not the only vehicle for conducting valuable research related to copper. A recent example is that of an LCA on piping material used for water distribution, which was undertaken in 1999 by an independent research institute in the Netherlands, CREM. This was carried out at the request of the Dutch authorities. The findings were overall positive for copper. According to the study, copper is the preferred material for distributing water from an energy-efficiency viewpoint.

What are copper's main challenges - and how is ECI responding to them ?

Our main challenge is to ensure that well founded science is properly integrated into the regulations. Sound information can reduce scientific uncertainty and hence the need for precautionary measures in regulations and management. One of the main challenges is therefore to be recognised as one of the partners in the regulatory debates and to have the right science at the right time and the right place. As most issues are initiated at national levels, while decisions at EU levels are taken by national EU member states, effective networking, organisation and co-ordination is needed.

In addition, industry representatives themselves must be made aware of the scientific developments that will ultimately help them support their case when meeting with key stakeholders and decision-makers.

In 1998, ECI launched a new Communications Initiative.

To ensure effective information flow, a number of regional/national co-ordinators were appointed by national industries to act as information rapporteurs on events occurring

* ECI and its partners are looking at research protocols on water quality criteria.

nationally that may affect copper's overall perception. In collaboration with ICA, a training programme in issues management and media response was launched. In 1999, representatives were trained for Austria, France and the UK, adding to those trained in 1998 (covering Scandinavia, Germany and the Netherlands).

ECI's Communications Committee helps develop briefing documents and position papers for consistent use by this broad European-based group.

What were the results of industry's participation in discussions regarding its key issues in 1999?

The initiation of dialogue has brought encouraging results. For example, ECI and its partners were involved in discussions related to the Water Framework Directive (WFD). This legislation is designed to develop a general policy on water covering river basin management plans, control of emissions from point and diffuse sources, and risk reduction measures on prioritised substances. Although the WFD has not yet been voted on in the European Parliament, contrary to the initial draft proposal the current proposal, does not include copper in the list of prioritised substances.

There is growing concern over the consequences of human activity on soil quality throughout the world. Is copper concerned, and if so, what is the industry doing about it?



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There is growing concern over the results of human activity on the quality of the air, soil and water. We strongly believe that the key to improving production and processing methods can only be found in a joint industry/regulatory approach.

Copper is particularly complex as it is a natural element, essential to all life forms and only partially bio-available due to a complex interaction between copper, the environment and living organisms.

Overly simplified assumptions on its effects, combined with precautionary measures, may

lead to the setting of unnecessarily strict safeguards, possibly even below essentiality levels, i.e. that which is needed by life forms to function properly.

Copper deficiency in soils is a world-wide concern. European farmers intentionally use copper compounds to ensure proper crop growth.

Interestingly, the US-EPA (Environment Protection Agency) is recognising the importance of bio-availability for surface water quality criteria (WQC) and is therefore currently investigating the use of the Biotic Ligand Model, developed through ICA research funds, for the revision of the US WQC for copper.

ECI and its members are contributing to ongoing debates on these matters. In 1999 a literature study was launched to look at all existing studies on the fate of copper in sewage sludge when disposed of on agricultural lands. Since this is a matter of particular concern in Sweden, the literature review was conducted by a Swedish research group, SERG (Swedish Environment Research Group).

The report, titled *Copper in Sewage Sludge and Soil*, contains detailed information about the occurrence of copper in sewage sludge and the benefits/potential risks of applying copper-containing sludge to agricultural lands.

In much the same way, ECI and ICA are sponsoring studies into the effect of copper in surface waters.

Copper is often coined as a heavy metal. As with other metals this is perceived as synonymous with toxicity. Why is that and what does it mean?

Copper, like other essential metals used by modern-day society, is often referred to as a heavy metal. This term is generally negatively perceived, when in fact it simply pertains to the density of a metal and has no relation to toxicity. Platinum, gold, uranium, lead, and silver are some of the other so-called heavy metals.

This is one example of an image deficit that concerns more than just copper. In many instances, because metals are considered as a family of substances, joining forces in the regulatory debate strengthens our position. Combining strengths on research projects allows a more cost-effective allocation of research funds.

ECI and the copper industry are active members of the European and international multi-metal organisations Eurometaux and ICME (International Council on Metals and the Environment). Multi-metallic joint research projects are carried out through co-operation between ICA, Nipera (the International Nickel Research Association) and ILZRO (the International Zinc and Lead Research Organisation), under the umbrella of the Eco-Toxicity Advisory Panel (ETAP) and involve independent international scientists.



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The EU has committed to a significant decrease in CO₂ emissions in the context of the Kyoto Protocol – does copper have a role to play in reaching these targets?

In 1999, ECI broke new ground by promoting energy efficiency in the transformer sector. A project was completed for the European Commission under the Thermie programme to define the technical, economic and business case for energy-efficient transformers in Europe. It identified transformers as the third contributor to climate change mitigation targets from the electrical sector. According to the study, the scope for yearly energy savings through the use of

* The THERMIE Report on high-efficiency transformers

energy-efficient transformers alone, is equivalent to the annual power consumption of over 5 million homes.

In fact, using more copper in electrical motors and transformers could save over 50 TWh / year of electricity, equivalent to over 20 million tonnes of CO₂ emissions. While Europe endeavours to meet its Kyoto commitments, the technology for these energy-efficient motors and transformers is available, and the case for using more copper is strong. It is not unusual that high efficiency motors show returns of 40-60%, and payback well within a year. Transformers have a slightly longer pay-back period but which remains extremely short compared to the average life-time of the product (up to 30 years).

The additional energy needed to produce more copper is minimal by comparison.

The Thermie study has established ECI as an organisation active in the field of energy efficiency and climate change mitigation. Work is underway to extend the research to Central Europe and to undertake a similar study on motors.

Is copper used in the context of renewable energy systems?

Many renewable energy sources generate either electricity or heat, and use copper intensely for efficient operation. A large, grid connected wind turbine can use over 4 tonnes of copper. Solar photovoltaic roofs need efficient cabling to save expensive energy generated at 0.5 euros / kWh.

Copper is used for storing and heating water from solar energy. Are there ongoing projects in the EU to help advance this application?



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The copper industry is actively promoting green technology. In the building and construction area, considerable investments are being made in the sector of solar heating systems, capitalising on copper's unparalleled performance as a heat conductor.

The Deutsches Kupfer Institut (DKI) has been developing an extensive solar heating campaign in Germany for several years. Elements of the 'Solar – Na Klar' campaign are also starting to be used in other countries.

COPPER IN SOCIETY

Chapter

2

Society

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Without doubt, copper contributes to human well-being and social development. In addition, it is a motor for technological advancement.

Despite strong pressure from competitive materials, copper remains a very widely used material. What is the industry doing to maintain its stronghold in these sectors?

For centuries, copper has played an essential role in everyday life. It remains one of the most widely used materials for essential commodities such as plumbing and heating. In the last ten years copper tube consumption for plumbing and heating increased by more than 200,000,000 metres. The amount of copper tube used in Europe in 1998 was over 1.1 billion metres, that's enough to circle the earth 28 times or three times the distance between the earth and the moon!

In 1999 the building and construction markets were stable, although growth surpassed expectations in Greece, notably due to strong demand for copper gutters and down-pipes.

Why do plumbers prefer to work with copper?

In 1999, we conducted a survey in several European countries to assess the professionals' views on copper. The red metal remains the professional plumber's first choice. In the survey conducted in the UK, plumbers explained why:

- the professional appearance and neatness of copper tubing compared to other materials
- copper is particularly good for visible work and gas installations
- its ability to withstand very high temperatures
- relative efficiency in heat transfer
- value for money
- proven longevity
- copper's versatility and the range of fittings offered: copper can be used in any installation
- track record for reliability and cosmetic quality

In short, in most cases, copper looks better and lasts longer.

Does copper deserve its reputation of being an expensive material?

Copper is sometimes viewed as an expensive material. Surveys conducted throughout the year in different EU countries tend to show that the initial price of copper installations is either equal to or slightly higher than that of competitive materials. However, given copper's durability, copper systems are always cheaper in the medium to long term.

What is the industry's position on education and training?



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Copper is a quality material. It is therefore necessary for copper installations to be carried out by professionals. The national copper centres organise local training programmes, which are co-ordinated by ECI. Courses vary from country to country. In some cases, one-on-one training is offered, in others, workshop participants learn to use educational kits. In Germany for instance, the educational kit devised by the Deutsches Kupfer Institut is 'the' reference for plumbing professionals. Similar to this is the 'Make the Right Start' module developed by the UK CDA.

In 1999, the copper industry was particularly active in providing training to young professionals in Hungary, the Czech Republic and Slovakia. The regional copper centres trained over 5,000 installers and students during the year.



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The Copper industry also believes in facilitating networking opportunities for young plumbers.

The Greek centre organises an annual 'Copper Day' to reach young professionals. In 1999, over 220 technical school students and 1200 professionals attended the event. Young plumbers competitions are also regularly held at national level, to help develop interest around the use of copper. Competitions were held in Benelux, France, Hungary, Poland, Spain and the UK in 1999.

What are copper's main areas of application in Europe?

Copper has been used by mankind for over 5,000 years, yet 60% of its current usage is for electrical applications developed over the last century. Use of copper for electric/electrical applications is currently divided into 45% for construction, 23% for infrastructure & 32% for equipment manufacturing. Wherever electricity is produced, transmitted or consumed, copper is present.

How does the industry carry out its Electric & Electronic promotional campaigns?

As an association, ECI acts as a catalyst in bringing together technical specialists within the electrical engineering sector. Small project groups work on specific items that can go on to be used either for lobbying purposes, e.g. to support a need for changes in standards and installation practices, or to raise awareness in the profession. ECI provides access to an international network and ultimately makes the conclusions and learnings available to a much wider audience.

ECI and the regional/national centres provide continuing education to professionals. We are notably active in continuous education courses for university-trained and vocationally-trained engineers in the electrical sector. CDA UK is certified as a CPD institute (Continuing Professional Development). In total, the campaign reached over 250,000 decision-makers in the electrical engineering sector.



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In 1999 the Italian centre, IIR, launched a Power Quality Distance Learning Site on the Internet (www.iir.it).

In addition, ECI and the CDAs promote electrical energy efficiency, observing the strict boundary conditions that efficient equipment must be environmentally friendly, in the user's economic interest, and contain more copper.

* First prize (NL) Copper benelux Young Plumbers Competition
** The Power Quality Distance Learning Site

Safety and power-quality (PQ) issues are of paramount importance for end-users. How can copper be positioned in these respects?

Despite its potential danger, electricity is safely used in houses, offices and industry throughout Europe. This is amongst others a merit of electrical installation codes that prescribe widespread use of copper for conductors, bonding, earthing and lightning protection (although other metals are used in some segments).

During 1999, ECI and the CDAs gained representation on electrical installation standards committees at both European and national levels in most European countries. An outcome of this involvement was a co-operation agreement between ECI and CENELEC, the standards organisation for the electrical industry in Europe.

Poor power quality is becoming an increasing problem in modern offices and industrial environments, costing European business many billions of Euros each year.

20% of fires are of electrical origin (the biggest single cause after arson). However, few fires are related to copper wiring.

When considered at the design stage, copper solutions can provide robustness against future possible problems at a very reasonable price.

The focus of the residential renovation campaign shifted from marketing training for electrical installers to fostering an environment favourable to electrical inspection and renovation. Spot inspections are being carried out, throughout Europe, to develop an outline of the status of wiring in the continent's ageing home stock.

Architects across Europe have been using copper for roofing and cladding for hundreds of years, both for the metal's unique mechanical properties and for its aesthetic appeal. What are the developments in this respect?



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European Copper Centres are in regular contact with architect associations.

At the same time, contacts with Member States' authorities have led to copper industry representatives being involved in the preparation of roofing standards for copper. This is notably the case in Greece, where the Hellenic Centre is represented on the ELOT Board, while the Italian Institute participated in the elaboration of UNI Norm 10372, the practice code for the planning and construction of metal roofs.

Several copper centres stage annual design competitions for copper roofing. In the UK, the 7th edition of the Copper in Architecture Awards took place at the Institute of Materials in London.

What are some of the more novel building and construction applications using copper?

Under Floor Heating systems (UFH) using copper tube to circulate heated water for space heating are used throughout Europe in domestic, commercial and public buildings. The water is circulated under the floor surface which becomes the radiator. A correctly designed and installed system gives an even floor temperature and attains a room temperature distribution which approaches the ideal.

Copper domestic sprinkler installations provide protection for all parts of the dwelling. Copper tube and fittings are the ideal choice for the pipework system. Copper tube has a proven ability to transport water and can be quickly and neatly soldered to form leak proof joints. When space is limited, the strength of copper allows the thickness of the tube walls, and therefore the outside diameter, to be kept small. Good resistance to corrosion from both atmosphere and water lead to long maintenance-free service.

Copper is already extensively used for UFH in certain countries and efforts are underway in France to increase market share. The French centre CICLA (Centre d'Information du Cuivre, Laitons et Alliages) produced a video on the advantages of copper for UFH with the support of the national gas distribution company, GDF.

In the UK, a national TV programme was aired on sprinkler installation and demonstration using copper.

Several micro-electronic components manufacturers have been publicising increased use of copper in new equipment. Why is that?

Copper's superiority as a conductor has made it the ultimate material for connecting the tiny switches or transistors in microprocessors, without which modern computer systems would not exist. Making these switches smaller and more numerous boosts performance, but increases the difficulty of wiring them together. Although aluminium wiring has been used on semiconductor chips for more than thirty years, the need for thinner and narrower wiring has resulted in a shift towards the greater use of copper.

This new copper technology permits the manufacture of a silicon chip which contains up to 200 million transistors - about thirty times more than the microprocessor chip contained in a typical desktop computer. Thus copper enables semiconductor manufacturers to make faster chips and to pack more functions in the same system, two vital components of the Information Technology revolution.

CDAs have been publicising copper's role in this new technology through press initiatives and combined activities with manufacturers. For instance in Germany copper chip technology was one of the main topics handled at a symposium organised by the DKI in Hamburg in May on 'Innovative uses for Copper.'

Recently introduced ADSL technology is also attracting a lot of interest from the media. What is the possible future of this technology?

Recently introduced HDSL (High Speed Digital Subscriber Line) and ADSL (Asymmetrical Digital Subscriber Line) technology is making it possible for telephone companies to capitalise on existing copper lines, and for businesses to adopt lower cost communications and networking options. In this way, high-cost alternatives can be avoided. For Internet users, these systems permit data transfer speeds of up to 1.5 million bits per second instead of the 56 thousand bits per second of conventional modems.

While ECI has not directly been involved in promotional activities surrounding ADSL, the media attention generated has contributed to a better positioning of copper as a material for the future.

What is the European copper industry doing to publicise copper's contribution to society?



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In 1999, a number of press releases were issued on new developments as diverse as the results of EU-funded research on high-efficiency transformers, to the study published by the independent Dutch research group CREM on tubing materials, to one on the copper content of the new euro coins.

Given copper's current image deficit in Germany and in Sweden, targeted communications activities were held in these countries to increase awareness of copper's overall benefits.

In Germany, the DKI staged a symposium on copper's innovative applications and a panel meeting of experts, on copper's role as an essential nutrient, to generate topical information on copper in the press.



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In Sweden, an advertising campaign was launched under the umbrella of the Scandinavian Copper Development Centre (SCDA) focusing on three messages: copper's essentiality, its recyclability and its durability.

ECI developed a generic brochure on copper's applications in an original design, for use by all its members. This provides an overview of copper's wide range of uses and its prospects for the future.

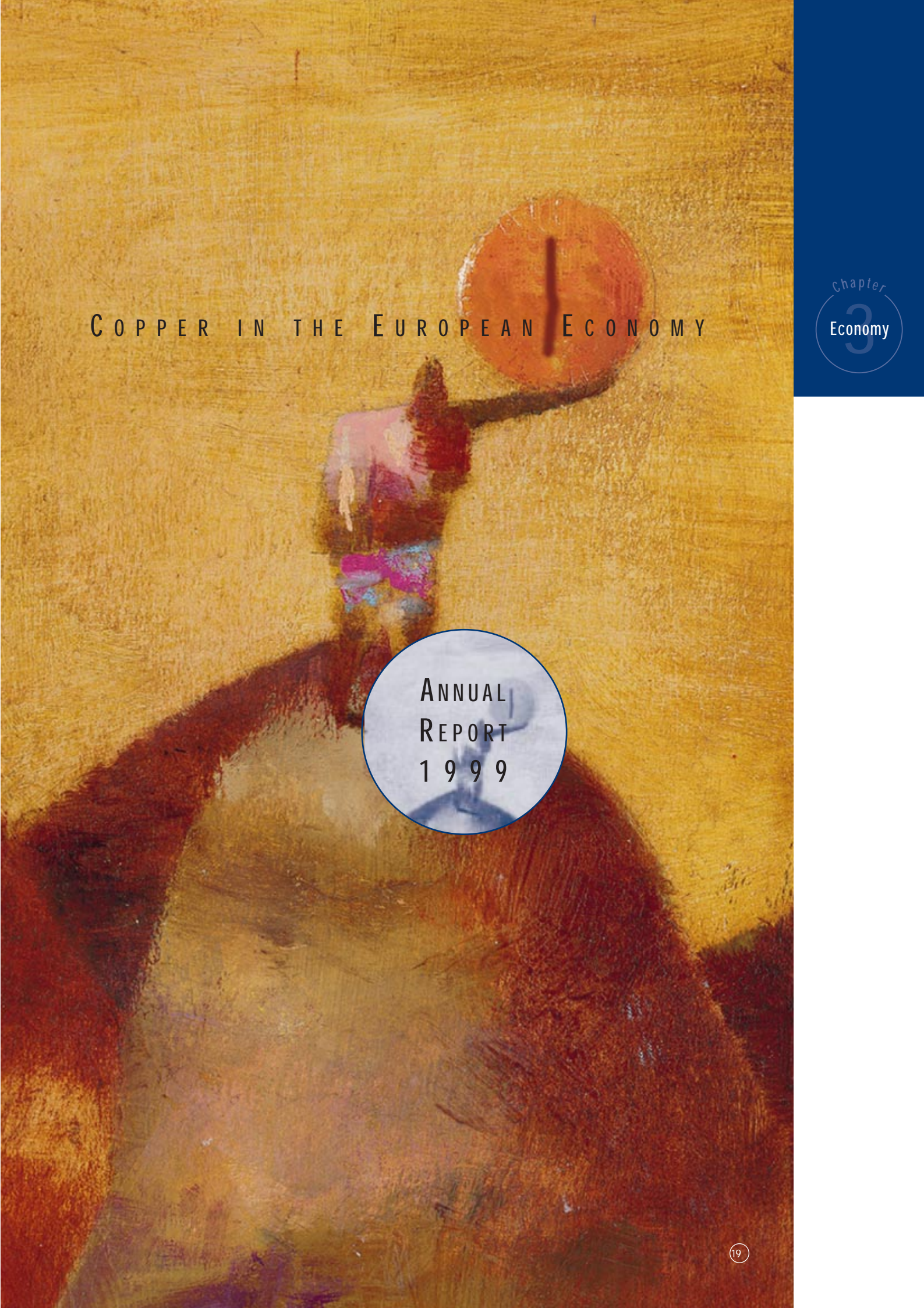
In addition, copper centres around Europe produced information booklets, leaflets or brochures on copper applications for specific audiences. Plans are also underway for ECI to launch its own web-site and an Extranet for its members. In the meantime, a temporary web portal to all copper centre sites in Europe is hosted on ICA's new copper site, www.copperinfo.com.

To facilitate retrieval of information for web users on plumbing applications around Europe, ECI provided support to the European Copper Plumbing Promotion Campaign in the establishment of an ECPPC portal page (www.copperplumbing.org).

Lastly, ECI and the copper centres took part in a number of events, seminars, fairs etc. to present activities undertaken in the different programmes. Every working day of the year a copper event takes place somewhere in Europe.



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An abstract painting with warm, textured brushstrokes in shades of yellow, orange, and red. A central figure, possibly a person, is rendered in a darker, more defined style, appearing to hold a large, circular, reddish-orange object above their head. The overall composition is vertical and expressive.

COPPER IN THE EUROPEAN ECONOMY

Chapter
3
Economy

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How large is the copper industry in Europe?

Representing 30% of the world's consumption, Western Europe consumed approximately 4.3 million tonnes of copper in 1999, equivalent to a per capita consumption of 9 kg.

Whereas copper mining has significantly decreased in the EU, Poland and Russia are important producers and exporters into the world market.

The core of the European copper industry is in refining, in the manufacture of semi-finished materials such as cathodes and wire rod, and in an extensive end-use fabrication industry.

Given the low output from local mining, how are raw materials sourced?

About half of the feed supplies to European refineries are sourced on the international market. Refineries convert purchased concentrates, blister, anodes and scrap into the necessary feed for the semi-finished industry and beyond. The other half is sourced via the recycling of secondary material from within the EU. This is one of the key and growing contributions that copper can make to the goals of sustainable development.

How significant is the usage of copper with respect to employment within the EU?

Best estimates indicate that in 1997 the European refining industry, involving a dozen major players, employed around 7,500 people. The eighty or so companies involved in the semi-finished area employ around 35,000 people.

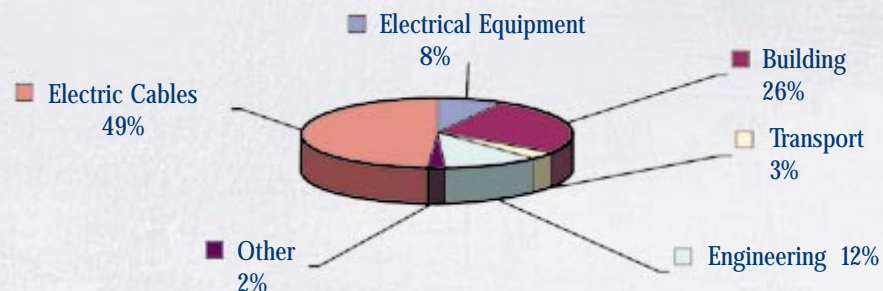
Given the broad coverage of copper products, for example electrical and data cables, construction material and automobiles right through to precision instruments and watches, end-use operations involve many hundreds of thousands of employees.

Which consumer markets are supplied by the industry?

Demand for copper mainly comes from the electrical and electronics industries, which absorb almost 60% of total EU consumption. These industries use copper primarily as a conductor material to carry electricity.

The construction sector is the second largest consumer. Excluding building wire, it accounts for approximately 25% of the total copper demand. A wide variety of semi-finished products, of both alloyed and unalloyed copper, are used in plumbing, roofing, decorative fittings, etc. The remaining 20% of demand covers industrial machinery and equipment, transportation equipment and consumer products.

European copper consumption by end use (IWCC Statistics)



What are copper's prospects for the future?

Copper applications in the EU are well developed and the growth pattern of copper consumption closely follows the cycle of overall industrial activity, as measured by GNP. Growth rates in Central and Eastern Europe are forecast to increase more rapidly as modern technology and materials are embodied in new investment.

The National Academy of Engineering recently published a top-20 list of the greatest engineering achievements of the 20th Century. Almost all of them require the use of copper.

1. Electrification

Copper is the best conductor amongst non-precious metals. More than 60 % of European consumption is for electrical and electronics applications.

2. Automobile

The average length of copper wiring in a family car is 1 km. Average copper and copper alloy content is 20 kg. Electric vehicles, that are powered by electric motors, contain far more.

3. Airplane

Copper represents about 2% of the weight of an airliner, including more than 190 km of wiring.

4. Water Supply and Distribution

Copper pipes safely distribute water to over 70% of European homes.

5. Electronics

Copper is used extensively in electronic equipment.

6. Radio and Television

Cathode ray tubes used in TV and computer monitors rely on copper.

7. Agricultural Mechanisation

8. Computers

Copper is critical to the manufacture of connectors and higher speed microprocessor chips.

9. Telephone

Copper is widely used in twisted pair telecommunications cable.

10. Air Conditioning and Refrigeration

An average 23 kg of copper is used in unitary air conditioner systems while approximately 2.2 kg are used in standard refrigerator/freezers.

11. Highways

12. Spacecraft

13. Internet

Recently introduced HDSL and ADSL technology capitalises on existing copper lines to transmit data at speeds up to 1.5 million bits per second.

14. Imaging

Copper-containing superconductors are a major contributor in the area of medical diagnostics and the production of magnetic resonance body scanners.

15. Household Appliances

Copper is used in most electrical appliances, incl. air conditioners, heat pumps, dishwashers etc.

16. Health Technologies

A copper coating applied to a surgeon's scalpel conducts electricity to heat the blade, rendering the instrument self-cauterising.

17. Petroleum and

Petrochemical Technologies

Copper and copper alloy catalysts play a key role in optimising product yields.

18. Laser and Fibre Optics

Copper is still used in interface devices used in conjunction with fibre optics.

19. Nuclear Technologies

Copper canisters are being used by the Swedish nuclear authorities to encapsulate spent nuclear fuel.

20. High-performance Materials

Copper is used in the fabrication of filamentary superconductors.

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In the 20th Century, widespread electrification revolutionised life in homes and in the workplace. From street lights to supercomputers, electric power makes our lives safer, healthier, and more convenient.

One need only consider the role copper has played in electrification and many of the achievements listed above to realise it has only started to develop its technological potential.

FINANCIAL STATEMENT

1999 ECI Administrative Expenditure (euros)

Personnel Related Costs (Salaries & Benefits)	864,922
Travel & Meeting Expenses	267,032
Office Rental, Service Charges, Taxes	97,495
Depreciation, Furniture & Equipment	44,685
Telephone, Fax, Email	17,439
Office Costs	41,632
Insurance & Miscellaneous	25,082
Legal & Audit Fee	48,021
Exceptional Item	263,415
<u>Total Expenditure</u>	<u>1,669,723</u>

1999 European Promotion Funds (Dollars)

<u>Market Initiative</u>	<u>ICA Funding</u>	<u>European Industry Funding</u>	<u>Total</u>
Plumbing Initiative	2,191,500	2,076,490	4,267,990
Roofing Initiative	1,473,500	1,397,620	2,871,120
ECI Interior Decor Initiative	82,000	90,800	172,800
Central & Eastern Europe	1,065,000	150,000	1,215,000
Wire Cable, Electrical/Electronic	1,550,000	644,500	2,194,500
ECI Specialist Markets	83,000	63,040	146,040
ECI - Market Intelligence	108,000	15,000	123,000
Environmental Programme	267,000	30,000	297,000
ECI Communications Initiative	797,000	50,000	847,000
European Copper Centre Network	865,000	2,240,000	3,105,000
<u>Total Promotion Funds</u>	<u>7,418,000</u>	<u>6,677,450</u>	<u>14,095,450</u>

EU Funded Projects (euros)

The project on 'The Scope for Energy Saving in the EU through the use of Energy-efficient Distribution Transformers' ran from November 1998 to November 1999. The project was co-ordinated by the ECI, with 4 partners: Pauwels (B), EDON - now essent (NL), ETSU (UK) and KEMA (NL). Funding for the project was provided by:

ICA	75,000
Partners	10,000
EC - DG 17	60,000
<u>Total</u>	<u>145,000</u>

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