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**Autumn 2012 - European Copper Institute News** **Copper and Electrical Safety**

## Editorial

# Copper industry supports electrical safety

Electricity powers a great deal of our daily activity and has become a familiar and trusted co-habitant of the human environment. However, dangerous and often illegal energy distribution remains a critical infrastructure challenge not just in the developing world, but also in areas of the EU.

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## Feature

# Electricity must be safe to be sustainable

Globally, electrical safety and sustainability are growing issues. Electrical safety is closely linked to achieving each of these goals but has been overlooked in recent years. Lack of access to safe, reliable and secure electricity dramatically impacts agriculture, access to water, health and education, with resultant impacts on economic development. The copper industry, as the supplier of the primary material in electricity use globally, understands the vital role it can play to provide solutions.

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## View from the Outside

# Copper's role in improving electrical safety and sustainability in West Africa

At AERE, our aims are threefold: to reduce energy consumption, to propose alternatives to the current energy and environmental situation, and to aid nations in making the necessary changes to lessen impacts on our climate. A range of studies and research, plus the evaluation of energy policies, projects and environmental planning, inform and enable us to make changes that enable better access and security of energy sources.

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## News

# Copper is facilitating the growth of renewable energy in the EU

In September the European Wind Energy Association (EWEA) announced that the European Union had surpassed 100GW of wind power capacity. Capacity totalling 6GW was installed during the first eight months of 2012, compared to the 9.6GW installed in 2011.

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## Video

# The Grand Return of Copper

French TV channel Stylia has featured copper in its weekly programme 'De beau de Bon de Bien Etre'. *The Grand Return of Copper* was inspired by the European Copper Institute's *Copper in a Box* exhibition as part of the Designer's Days event event in Paris in May 2012.

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## Event

# A Swedish and Polish Contribution to the EU Raw Materials Initiative (27.11.2012, Brussels)

This event is being organised with support from the Permanent Representation of Sweden to the European Union & Permanent Representation of the Republic of Poland to the European Union in light of EU initiatives such as Horizon 2020 and the EIP in Raw Materials.

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Nov 15

# Copper industry supports electrical safety

Author: John Schonenberger
Tags:
Comments: No Comments

In most European homes, offices and public spaces we take electrical safety for granted. Electricity powers a great deal of our daily activity and has become a familiar and trusted co-habitant of the human environment. However, dangerous and often illegal energy distribution remains a critical infrastructure challenge not just in the developing world, but also in areas of the EU.

Unsafe electrical installations impact human health, economic & social development and increases carbon footprint since unsafe systems are typically old and therefore have higher losses.

Copper is the principal conductor of electricity due to its uniquely suitable properties. As such, the European Copper Institute (ECI) wants to help highlight and drive solutions towards increasing electrical safety. As examples, ECI has taken an active role in promoting the safe and sustainable supply of electricity through projects partners such as FISUEL and the West-African Alliance for High Performance Distribution of Electricity.

In this edition of the Copper Wire, we take a closer look at the importance and impact of this issue, both in Europe, and beyond, as well as outline some of the efforts underway to change the situation. We are grateful for the input of Anne Rialhe, Director of AERE and Edgar Blaustein, expert on energy, associated with AERE for the SEEA-WA project.

*John Schonenberger*
*Chief Executive*
*European Copper Institute*

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# Electricity must be safe to be sustainable

Nov 15

Author: Irina Dumitrescu
Tags:
Comments: No Comments

Globally, electrical safety and sustainability are growing issues. The United Nations General Assembly declared 2012 the '*Year of Sustainable Energy for All*' and has set three goals for 2030: (1) universal access to electricity, (2) double the rate of energy efficiency improvements, and (3) double the share of renewable energy in the global energy mix.

Electrical safety is closely linked to achieving each of these goals but has been overlooked in recent years. Lack of access to safe, reliable and secure electricity dramatically impacts agriculture, access to water, health and education, with resultant impacts on economic development. This is as true for citizens living in the EU, as well as in the developing world.

The copper industry, as the supplier of the primary material in electricity use globally, understands the vital role it can play, not only to provide solutions to this unacceptable situation, but also to raise the profile of the 1.4 billion people who do not have access to the electricity they need to be able to improve their well-being and live safely.

**Challenges faced in developing countries**

A whole host of problems arise from the lack of a safe and reliable electricity supply. Poorly installed electricity cables and the use of alternate energy sources increase the number of fires, injuries and deaths. Inefficient installations, with high losses, make electricity too expensive in developing countries and problems, such as illegal selling on and theft, are rife.

The copper industry is working with other industry groups, donor agencies and local authorities to help alleviate such problems. As examples, the Copper Alliance has been involved in two slum electrification projects, one in Paraísopolis, Brazil, and the other in the Pikine settlement on the outskirts of Dakar in Senegal.

**Case study: Slum electrification in Paraísopolis, São Paulo**

The Copper Alliance coordinated a slum electrification project in Paraísopolis, São Paolo's second largest favela, with over 20,000 households and 3,000 businesses. Copper intensive solutions dramatically improved the quality of the infrastructure, eliminated illegal access to electricity and reduced consumption to more sustainable levels, both financially and environmentally.

New meter systems created awareness of electricity consumption. In addition, a bi-coaxial copper cable was inserted into the new service line of each individual meter to avoid theft. Conventional – and usually overloaded – distribution transformers were replaced with energy efficient ones using copper winding wire. As a result, monthly consumption was reduced by 40%, from an average of 356 to 200 kWh per customer.

Older, inefficient refrigerators were replaced with high energy efficiency models containing more copper. These accounted for half of the monthly savings.

Primarily for safety reasons, better-than-code sized wiring was installed and, on average, has saved 11 kWh per month. In residences, a copper cross section of 2.5 $mm^2$ was used for supply and 4 $mm^2$ for electrical shower water heaters.

In some instances, copper has been employed in solar water heating systems in the form of copper tubing.

Moreover, this project generated new jobs with 200 people being trained to install pre-heating systems. Overall, the investments in energy efficient systems were about 46 million € and the investments in the electrical networks to improve the safety conditions and quality of the energy were around 53 million €. This led to a 500GWh energy savings that 350.000 homes and 10.000 small business benefited.

**Electrical safety in the EU**

In the EU, electrical safety is equally important, although the challenges faced are of a different nature.

50% of EU homes date from before 1970. Many have never undergone a renovation of their electrical functions and are unable to cope with ever increasing, modern day demands.

ECI estimates that, on average, we could reduce our energy consumption by 5% if older installations were upgraded. The additional sustainability benefits of a safe and periodically inspected electrical system include the ability to integrate renewable energy sources, such as photovoltaics, building automation systems and energy storage, such as through a hybrid/electric powered vehicle. Moreover, buildings that benefit from safe and periodically inspections are prepared for changing demographics and living patterns.

Taking France as an example, on January 1st, 2009, a regulation on the mandatory inspection of electrical installations came into place. The results of the first year of inspections speak for themselves – 72% of installations failed at least three of the five minimum safety requirements. As set by the French government, these are an appropriate and accessible main isolator, all live parts sufficiently insulated, an appropriate earthing network, an appropriate fuse, or circuit breaker, on every circuit to project against over current, and all bathroom sockets to be protected by a residual current device.

Through examples, such as those above, the copper industry has demonstrated an important role, not only in providing a safe and reliable electricity supply, but also in creating a more sustainable energy future. Affordable electricity, economic development, energy efficiency, a better lifestyle and a safer living environment are all within reach by incorporating copper effectively into our building infrastructure.

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Nov 15

# Copper's role in improving electrical safety and sustainability in West Africa

Author: Irina Dumitrescu
Tags:
Comments: No Comments

In December 2010, the UN Secretary General Ban Ki-moon launched the 'Sustainable Energy for All Initiative'. In 2012 alone, the EU has mobilised €500 million to support this. As an important plank of this initiative, the West African Alliance for High Performance Distribution of Electricity was launched in Accra on 31st October. The European Commissioner for Development was represented by His Excellency Claude Maerten, the EU Ambassador to Ghana. Other EU based partners included the French Energy and Environmental Agency, the Austrian Energy Agency, EDF and the European Copper Institute. In this edition of the 'View from the Outside' Anne Rialhe, director of AERE and Edgar Blaustein, expert on energy, associated with AERE for the SEEA-WA project, describe the project and the benefits copper has been able to bring.

*Anne Rialhe, PhD. is the director of AERE (www.aere.fr), a consultancy team specialising in energy efficiency and renewable energy for the sustainable development of the residential, transportation, industry and agriculture sectors. Based in France, Anne has more than 20 years' experience working in various EU member states, China and West Africa.*

'Energy' is the lifeblood of human civilisation, enabling education, medical care, travel, communication, business and more. As such, access to safe and secure energy is a fundamental necessity for development.

At AERE, our aims are threefold: to reduce energy consumption, to propose alternatives to the current energy and environmental situation, and to aid nations in making the necessary changes to lessen impacts on our climate. A range of studies and research, plus the evaluation of energy policies, projects and environmental planning, inform and allow us to make changes that enable better access and security of energy sources.

Solutions for environmentally friendly energy consumption and production, as well as the economics of natural resources and reducing the consumption of fossil fuels, are all key factors on the path towards a safe and secure energy supply.

In our role as a technical partner of the West African Alliance for the High Performance Distribution of Electricity, AERE supports local initiatives through technical aid, financial resources and knowledge on best practices in safe energy supply.

This initiative is one of five developed as part of the Supporting Energy Efficiency for Access in West Africa project, financed by the ACP-EU Energy Facility, the UNDP and ADEME, and managed by the ECOWAS Centre for Renewable Energy and Energy Efficiency. The project aims to overcome the technical, financial, legal, institutional, social, gender and capacity related barriers that hinder the implementation of cost effective energy efficiency measures and systems.

Throughout our work, it is clear that copper is one of the key elements required to deliver energy efficiency. This is especially true in terms of the distribution and transport of electricity, in transformers, in industrial motors and in products such as cables, air-conditioning and refrigerators.

The case for action in West Africa is strong. Unreliable power supply costs West African economies 2% in annual growth. Currently, over 60% of the population of West Africa does not have access to electricity and, for those who are lucky enough to have access, black outs and brown outs remain a daily issue. Despite the energy supply in West Africa being both unreliable and extremely costly, there is immense energy waste and inefficient usage.

Through the ECOWAS initiative, specific technical measures for improvement include:

- Regular inspection of lines to identify and remove illegal, unsafe connections and to encourage all users to become paying customers;
- Regular preventative maintenance of all components of the distribution system, to ensure reliable supply. This includes the upgrading of overloaded lines and transformers, plus the replacement of outdated and inefficient components;
- High voltage distribution systems that improve power quality and are less open to theft;
- Installation of pre-paid meters to improve bill collection and relations with clients;
- Shortened billing cycle, with a bill being provided after each meter reading.

Copper has a key role to play in almost all of the above improvements. As the primary electrical conductor and its flexibility in terms of usage, from metering systems and transformers to cables and wiring, the use of copper is imperative to improving electrical safety and sustainability in West Africa.

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# Copper is facilitating the growth of renewable energy in the EU

Author: Irina Dumitrescu
Tags:
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In September, the European Wind Energy Association (EWEA) announced that the European Union had surpassed 100GW of wind power capacity. Capacity totalling 6GW was installed during the first eight months of 2012, compared to the 9.6GW installed in 2011. This demonstrates that, although the growth of EU renewable energy capacity has slowed due to the financial crisis, it still continues at a fairly steady speed.

Renewable energy systems (RES) contain high amounts of copper, as it is the best electrical conductor available. On average, 4,000 tonnes of copper are used in the manufacturing and installation of each GW of renewable energy.

The addition of 30GW of renewable energy capacity in the EU will require an estimated 120,000 tonnes of copper, around 4% of the EU's annual copper demand for conductivity applications.

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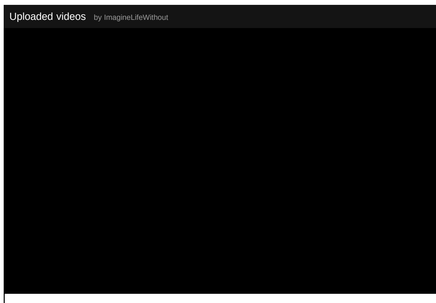

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# The Grand Return of Copper

Nov 21

Author: Irina Dumitrescu
Tags:
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French TV channel Stylia has featured copper in its weekly programme 'De beau de Bon de Bien Etre'. *The Grand Return of Copper* was inspired by the European Copper Institute's *Copper in a Box* exhibition as part of the Designer's Days event event in Paris in May 2012. This event illustrated and cemented copper's role in contemporary design. Multicoloured and luminous, malleable and versatile, durable and 100% recyclable, the red metal is captivating more and more designers.

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# A Swedish and Polish Contribution to the EU Raw Materials Initiative (27.11.2012, Brussels)

Author: Irina Dumitrescu
Tags:
Comments: No Comments

This event is being organised with support from the Permanent Representations of Sweden and Poland to the European Union. Representatives from the Swedish and Polish governments, companies and academia, DG Enterprise, DG Research & Innovation, members of the European Parliament and representatives of EU Member States will be in attendance. The speaker panel will include mining executives Mr. Per-Erik Lindvall, Vice President of LKAB, Mr. Lennart Evrell, President of Boliden and Mr. Herbert Wirth, CEO of KGHM Polska Miedź.

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