

GREEN INITIATIVES AND THE CABLE INDUSTRY



ICF NEWS

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AND THE CABLE
INDUSTRY**
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MESSAGE FROM THE ICF SECRETARY GENERAL

ICF Website

The new ICF website www.icf.at is now up and running. We encourage all members to provide us feedback and suggestions to further improve the content.

ICF Congress Amsterdam 2014

Please note the dates of next year's congress: it will be held from 30 September to 3 October 2014 at the Renaissance Hotel in Amsterdam. The Standing Commission will start with the program development at its next meeting early January.



SEASON'S GREETINGS AND BEST WISHES FOR THE NEW YEAR FROM VIENNA!



GREEN INITIATIVES AND THE CABLE INDUSTRY

Provided by CRU

INTRODUCTION

Sustainability Gaining Traction

Industry parlance uses the term “sustainable” to broadly describe “green” initiatives that are promulgated by industry organizations and adopted by a wide array of suppliers, manufacturers and end-users. Sustainable not only covers the measures being taken to protect the environment, but reflects the cost-saving measures implemented to improve margins and the on-going adherence to standards that deliver products that meet safety and performance requirements. In this article we look at what the cable industry is doing to improve its green credentials.

Much of the discussion around green cable specific product-developments in recent years relates to the use and marketing of halogen free, flame retardant (HFFR) compounds used in cable jacketing and insulation. Such cables are used in applications such as shipbuilding, enterprise, data centre and other applications, where cables are deployed in closed environments and where people work or live.

Although industry participants are actively developing greener products as a way to differentiate themselves from competitors, the ability to deliver cost-neutral products at this early stage is low. Thus, R&D is one of many elements that fall under the umbrella of sustainability, and much of the effort and success of green initiatives to date relates to broader efforts to reduce costs through-

out the value chain that will increase shareholder value.

Background

Concerns about sustainability and the environment in the United States have been around since the 1960s, chief among them, the publication of Rachel Carson’s Silent Spring in 1962 and the Cuyahoga River fire in 1969. These events helped lead to the establishment of the Environmental Protection Agency in December 1970.

Important early legislation included Clean Water and Air Acts and subsequent amendments. Improvements in smoke emission and fire propagation in cable designs followed disasters such as the Brooklyn subway fire in December 1990 where an exposed power cable short-circuited, exploded and burned the PVC jacket releasing toxic gases. Two deaths resulted and another 188 people were treated for injuries. Even in 1982 concerns were raised with the New York City Metropolitan Transit Authority (MTA) about cables with PVC and the potential for deadly fumes in the event of fire. The MTA declined to remove installed cables saying the presence of PVC did not constitute a hazard, but opted to use safer cables in the future. In Europe similar high profile fires led to the development of new cables.

Role of NGOs

Safety, performance and environmental considerations necessitated the establishment of standards bodies comprised of industry experts to define minimum

acceptable performance requirements. Some of these committees are well known and are shown in Figure 1.

ISO stands for the International Organization for Standardization and is located in Geneva, Switzerland. ISO promotes the development and implementation of voluntary international standards, both for particular products and for environmental management issues. ISO certifies companies in environmental management and energy management.

The International Electrotechnical Commission’s (IEC) is composed of national committees that appoint experts and delegates to the IEC. The TC 89 subcommittee is responsible for standards relating to fire hazard and smoke that covers corrosivity, toxic gases and abnormal heat.

Located in Washington DC, the American National Standards Institute (ANSI) is the voice of the US standards and conformity assessment system and the official representative to the IEC and ISO. UL or Underwriter Laboratories calls itself an independent safety science company that certifies, validates, tests, and inspects wire and cable products for industrial and consumer applications. UL actively works to bring its own standards in alignment with international organizations.

The National Electrical Code (NEC) is developed and published by the National Fire Protection Association (NFPA) since 1911.

SUSTAINABILITY

SELECTED STANDARDS ORGANIZATIONS

PERFORMANCE STANDARDS

IEC

ISO

ANSI

UL

NEC



REQUIRES BROAD COMMITMENT



Figure 1 | Source: ICF

Proper adoption and enforcement of these standards requires broad acceptance by all industry stakeholders (Figure 1) and a commitment to adhere to those norms. Thus, materials suppliers need to deliver the appropriate products to the wire and cable manufacturers that can be sold to end-users. Industry advocacy groups as well as a growing number of green-focused organizations are able to educate and assist industry participants on important trends. In some cases, activist groups are able to generate attention—sometimes negative—that influences boards of directors to make environmental considerations a priority.

None of the green initiatives that have been adopted would have been possible without the significant role played by national and international standards organizations. The organizations mentioned in Slide 1 form the backbone of industry's ability to responsibly address critical challenges. Technical sub-committees work to account for emerging trends and incorporate changes to all standards affecting the wire and cable industry.

Europe Leading the Way on "Green"

Over the last twenty-five years a combination of political and technological changes has profoundly altered the landscape and helped give Europe a stronger voice in international and business affairs. The emergence of the European Union from the previously separate 27 countries necessitated a unified approach and harmonization of standards. The combination of growth in the Internet and wireless communications has allowed for closer relationship-building with far-flung operations and spurred greater opportunities for cross-fertilization of ideas and stronger company identification that is more closely

aligned with executive management. This development has helped form more "monolithic" multi-national corporations that adhere to internal directives and processes, but that also are more accommodating to and respectful of local customs and traditions.

This breaking down of barriers has allowed Europe to become a leader in developing sustainable and green initiatives. One area that has shaped the sustainability narrative was the introduction in July 2006 of the European Union's Restriction of the use of certain Hazardous Substances in Electrical and Electronic Equipment directive (ROHS), and pronounced as either "Roe-hoss" or "Ross". ROHS compliance refers to minimum agreed levels for the use of lead, cadmium, mercury, hexavalent chromium, polybrominated biphenyl (PBB) and polybrominated diphenyl ether (PBDE) flame retardants. The directive henceforth forbade the sale of any products containing those banned substances.

Only a year after ROHS standards were established, a separate European initiative called REACH, which stands for Registration, Evaluation, Authorization and Restriction of Chemicals was formulated and became law in June 2007. REACH is administered by the European Chemicals Agency (ECHA).

REACH establishes thresholds that have been established for certain chemicals that are deemed to be dangerous or unmanageable. Companies must register the types of chemical used in products entering the EU. REACH also compiles a list of substances of very high concern (SVHC) that are reviewed on a continual basis for toxicity and biological concerns. Dangerous substances are labelled as either "carcinogenic" or "toxic for reproduction".

Other Organizations Supporting Green Initiatives

A host of non-regulatory bodies and industry-related organizations also have been established that proactively seek to inform, educate, promote and assist in the pursuit of green initiatives. Some of the European organizations include: VinylPlus, the sustainable development advocacy arm for the European PVC industry, the European Council of Vinyl Manufacturers, the European Stabiliser Producers Association, the European Council for Plasticisers and Intermediates, and the European Plastics Converters.

In North America, a certification system for high environmental quality buildings certified as energy-efficient and respectful of the environment known as Leadership in Energy and Environmental Design (LEED) has been adopted. Global cable manufacturers play a role in contributing to achieving this certification, and some developers outside North America are choosing to have buildings constructed to LEED standards. One example is the Beirut City Center shopping mall built in 2012.

The Global Reporting Initiative (GRI) has developed a comprehensive Sustainability Reporting Framework that is widely used around the world. Many companies now publish sustainability reports that cover the economic, environmental and social impacts caused by its everyday activities. A sustainability report also presents the organization's values and governance model, and demonstrates the link between its strategy and its commitment to a sustainable global economy.

Corporate Sustainable Responsibility

Organizations have adopted the phrase, corporate and sustainable responsibility

FUNCTIONAL AREAS

SUPPORTING
SUSTAINABILITY
REFORM



R&D, SALES AND MARKETING



PROCUREMENT



MANUFACTURING



LOGISTICS



INTEGRATED SUSTAINABILITY

(CSR), to account for and communicate a company's efforts to meet social and community-building efforts as well as steps taken to reduce a company's carbon footprint.

For one major chemical company that supplies products into the wire and cable industry, "sustainability means aligning economic success with environmental and social responsibility to ensure long-term business success."

Within an organization, all functional areas shown in Slide 2 will need to implement the necessary strategies to fully integrate sustainable practices and process improvements.

The primary raw materials used by the world's largest cable manufacturers are copper, aluminium and petroleum-based products such as PVC and polyethylene. But the growing complexity in meeting sustainability targets for global companies is underscored by the use of as many as 4,000 materials suppliers.

To address this complexity, global manufacturing companies likely have a function that collects and aggregates data and is responsible for its management and analysis. This function also coordinates company policies with RoHS, REACH, Life Cycle Assessments (LCA) and Safety Data Sheet (SDS) standards that can be disseminated across its global footprint. A company may seek to reinforce its commitment to sustainable practices by adopting a Code of Ethics by which suppliers consent to abide.

One approach is to conduct a Life Cycle Assessment (LCA) that involves not only a phased approach from raw material acquisition to manufacturing, but also seeks to efficiently deal with waste by-products. LCAs help define the goal and scope of work. Once defined, an inven-

tory assessment is conducted followed by an environmental impact assessment. Last, the results from the second and third phases are interpreted against the goal to determine the appropriate product, process or service to be used.

The LCA approach covers the environmental criteria such as volumes of raw materials used and CO2 emissions and waste materials produced. Slide 3 shows the criteria that a major cable manufacturer uses to comply with internationally accepted sustainability practices.

Although this company's total waste in tonnes increased by 5% in 2012, the amount of hazardous materials generated year-on-year fell by 19%. As a percent of total waste material produced, the hazardous waste accounted for 5.1% in 2012 compared to the 7.2% share achieved in 2011.

Some Logistical Consideration

Manufacturers have substituted wooden battens on cable reels with plastic wrapping, and re-designed wooden drums to reduce wood consumption. Reel collection rates as high as 70% for re-use in domestic markets has also been reported by some manufacturers.

Another initiative which reduces waste is the use of eco-friendly or re-useable containers for holding and transporting petroleum-based products such as the filling and flooding compounds used to prevent ingress of water from contacting optical fibres.

GREEN MATERIAL INITIATIVES

As we have noted above one of the areas where companies are keen to promote "greener" cables is in terms of the materials that are used in their production.

Promoting a cable as using more environmentally friendly materials also has the benefit that this also potentially reduces the competition from low tech low cost manufacturers. So called "green" materials may be harder to process, of proprietary formulation, harder to source, and may also need the back up of a large engineering department, so low tech, low cost manufacturers find it harder to produce these cables.

Slide 4 shows three silos covering major cable components including conductors, jacketing and insulation--a primary area of interest for green initiatives, and an "other" category.

Conductors

There is only limited scope to suggest that there are more environmentally friendly conductors than copper or aluminium, but there are some companies out there that are attempting to promote copper clad aluminium (CCA) as a "green" alternative to copper on the basis that its lower weight can potentially have less impact on the environment. However, since it is much harder to recycle compared to pure copper, any potential gain would be more than offset by this lack of recyclability and we do not view CCA as a realistic alternative to copper from an environmental view point. It could be argued that aluminium is a more environmentally friendly material than copper due to its lower weight, but producing aluminium is a very energy intensive process and we do not see any real major developments in terms of alternative conductors to be promoted as fundamentally more environmentally friendly.

Fibre

One of the potential areas addressing environmental issues and cost savings with optical fibre is the use of LED-based curing systems used on draw towers to cure the acrylate coating used to protect the core and cladding. The system

ENVIRONMENTAL MONITORING CRITERIA

ENERGY CONSUMPTION

WATER CONSUMPTION

HAZARDOUS & NON-HAZARDOUS WASTE USE

OZONE-DEPLETING SUBSTANCES

GREENHOUSE GAS EMISSIONS

RAW MATERIAL EFFICIENCY

OPTIMIZED ENVIRONMENT



REDUCED COSTS



CABLE COMPONENTS

CONDUCTORS

COPPER
ALUMINUM
FIBRE

JACKET/ INSULATION

POLYETHYLENE, PVC
TPU, TPE, PVDF
LSF COMPOUNDS



OTHER

GEL/DRY TECH.
STRENGTH ELEMENTS
RIP CORDS
BINDING YARNS

comprises a UV Lamp and LED curing system that uses high power LEDs with a narrow band of emission that allows for higher yields and reportedly lowers utility costs by as much as 30%-70% for wire & cable applications. The air-cooled design eliminates the need for external cooling or ozone extraction thereby eliminating containment and waste-related costs.

Some manufacturers are making 200µm fibres versus the traditional 250µm +/-5µm. Inking or colouring fibre for identification adds another 3-5µm. In a recent technical paper, thin skin micro-modules containing twelve 242µm fibres have a diameter of 1.15mm. Using 200µm fibres, the diameter is reduced to 1.0mm. The smaller diameter fibre permits greater density and also produces significant weight savings.

We have seen claims that fibre optic cables are more environmentally friendly than copper ones as the main raw material to make fibre, silicon, is abundant. However, we do not believe that customers choosing between copper and fibre are going to make this decision on environmental grounds.

Insulation and Jacketing Material

The main focus of companies' promotion of "greener" cables is based on the use of polymers which are said to offer an advantage over traditional materials. Generally this means promoting alternatives to halogenated materials, materials using phthalates or ones with heavy metals in. There are also companies offering "greener" alternatives of traditional materials such as PVC, which have reduced acid gas and smoke emission. There are also now alternatives available to replace lead sheaths.

In terms of halogens the main historical uses have been in PVC, FEP or brominated flame retardants, and the alter-

natives are usually some form of low smoke zero halogen compound (LSOH or LSZH) often based on EVA, or the use of alternative flame retardants such as aluminium trihydrate (ATH). LSOH cables were originally developed for their performance in a fire, but they are now also being marketed as more environmentally friendly in that when they are burnt the emissions are less toxic to the environment. Thus whilst originally LSOH cables were purely seen as an alternative to PVC cables for use in areas such as public buildings where fire was a real hazard to human health, the promotion of them as more environmentally friendly opens up a much larger potential market. It also means that in North America, where fire safety has taken a different path to Europe, this has opened up an alternative way of promoting these types of cable.

The use of Phthalates as plasticisers has been under attack for many years since one of the original compounds, DOP, was classified as a carcinogen. Many companies now use the fact that their products don't contain phthalates as a way of promoting their green credentials, and there are numerous alternatives available.

Another development has been the introduction of plasticisers made from renewable sources to make a cable "greener". One example in North America is the collaboration between a chemical and a compounding company. The chemical company provided a bio-plasticizer that was further enhanced and modified to develop a product with a low volatile organic content (VOC) that didn't smell. PVC typically releases 24%-25% acid gases when burned, whereas an HFFR compound emits less than 0.5% acid gas. The acid gas performance of the greener compound falls in between PVC and HFFR.

This approach is also being explored with the basic polymer itself with for example ethanol based bio-polyethylene being offered at least as a partial replacement to traditional oil based polyethylene. There would seem to be further potential for the cable industry to develop more use of polymers derived from renewable resources.

Gel Compounds

An important component used in optical cables is gel-filling compound that is injected into the tube containing optical fibres as the tube is extruded. Filling gel serves two purposes: 1) It prevents water from contacting the fibres, which would compromise the fibre's integrity, and 2) it protects the fibre as the cable is bent or flexed during handling and installation, or during temperature cycling once the cable is installed.

Roughly eighty percent of the filling gel material used in cables is petroleum-based, but to meet performance requirements a specialized thixotropic rubber compound is added that accounts for the remainder of the finished product. Thixotropic refers to the gel's ability to transition from a gel to a liquid-state when there is some shear effect or movement on or at the boundary layer. Once movement or shear effect stops, the rubber additive causes the liquid to revert back to a gel. Gel in a liquid state allows the fibre to move and prevent micro-bending losses that would impair the fibre's optical performance.

Gels for more specialized cable designs such as optical groundwire (OPGW) that are installed in place of standard earth wires on high voltage power lines contain a more expensive hydrogen-absorbing material that can withstand hydrogen released from the stainless steel or aluminium tubes containing the fibres.

Gel manufacturers are looking at developing a plant-based product using vegetable oils, but there are a number of technical challenges to overcome: 1) Mineral-based oils are non-polar and allow the thixotropic rubber compounds to easily dissolve in the oil-based mixture. Plant-based oils are polar and do not allow the rubber compounds to easily dissolve. 2) Petroleum-based oils are non-nutritive. In other words, they do not act as a food source for algae or other potentially harmful agents. 3) Plant-based oils have a higher acid value that is problematic when they come into contact with tubes, fibres or matrix material, and 4) a green product using plant-based oils is more expensive as there is insufficient scale to compete against cheaper petroleum-based products.

The polarity of the plant-based oil remains a significant hurdle and will need to be resolved before a greener filling compound can be commercialized. It's possible that gels with plant-based oil may gain some market acceptance in advanced economies, but likely would not be as readily accepted in emerging markets due to higher cost.

Some end-users prefer totally dry cables that rely on super-absorbent polymers used in yarn or tape products as an alternative to using filling gel. Another trend is the growing acceptance of cables with reduced diameters that exploit the availability of a new family of bend-optimized fibres that eliminates the negative effects of micro bends.

During the production process and also during a cable's subsequent life, the polymers used in insulation and sheathing often give off gasses. For example when a power cable is insulated with XLPE the production process generates gasses that must be allowed to escape from the insulation. When a cable is

installed there will also be potentially some emissions of gas during the lifetime of the cable and some manufacturers are offering alternative cables which are classed as more environmentally friendly because they use materials which have lower emissions in production and during the cables installed life.

RECYCLABILITY

It's one thing to reduce the impact on the environment during a production and use, but there is also a growing focus on what happens to a product after its useful life is at an end, and how easy it is to recycle. The cable industry is very involved in this process since wire and cable is included in very many different products such as cars, buildings, electrical appliances etc. In fact wire and cable is a part of any product which uses electricity. The use of recycled materials in the production of wire and cable is also a potential "green" selling point.

Data from VinylPlus 2012 report shows that recycled PVC used in cables in 2012 was roughly 90,000 tonnes or 25% of recycled PVC in EU-27 countries (plus Norway, Switzerland and Turkey). And the production of lead stabilizers has declined from 100,000 tonnes in the same EU-27-3 countries to 25,000 tonnes in 2012. Meanwhile, calcium stabilizer production has increased from 60,000 tonnes to 90,000 tonnes over the same five-year period.

Ease of Recycling

Cables vary enormously in terms of their complexity and the number of different types of material that they use in their construction, but one feature of them is that they are usually long and thin (in relation to length), and as such they can be quite a challenge to recycle. There are companies that specialise in recycling

used cables and machinery is available to do this, but cable manufacturers can also help by redesigning their cables to make them easier to recycle. There is no problem in recycling the copper, aluminium conductor, or steel armour once it has been removed from the cable, but recycling the insulation and sheath can be more challenging. Traditional cross-linked compounds are difficult to recycle because of the curing process, but some cable companies do offer alternatives that they claim are able to be more easily recycled.

Some manufacturers now also offer to take back unused short lengths of cable and recycle these for the customer. As an incentive they typically offer to credit the customers with the recovered value less a processing and transport cost. We are also aware of one cable company that is offering to take back and recycle at no cost used HDPE insulators at the end of their life. Whilst it is clearly easier to offer this sort of service with a simple insulator, the whole area of recycling cables is one which we expect to grow over the next few years.

Use of Recycled Materials

Another part of the recycling arena is the use of recycled materials to produce new cables. Again there is no problem in using recycled copper and aluminium provided it does not include any impurities, so for example clean scrap conductor can be fed back into a copper rod mill. Recycling conductor recovered from scrap cable may need more processing but then it can easily be used in a new cable. Cable companies have long reused some scrap polymers generated in the production process, usually for bedding where the material properties are not so critical, but the reuse of polymers generally is not easily achieved. As a selling point the use of recycled materials is probably not what many



customers want to hear due to worries about quality, but in the longer term this is something that the cable industry may need to look at more closely.

OTHER POTENTIAL CABLE DESIGN IMPROVEMENTS

There are a number of other areas where it is possible to promote cables as being better for the environment although in some cases the link can seem a little tenuous.

Extended Life

Defining the true life of a cable can be quite hard, and in many cases the product that the cable is attached to will have a much shorter life than the cable so extending the life of the cable will not achieve anything. Cable companies typically quote a lifetime of up to 40 years for their products so offering a longer life on cables for vehicles, and electrical appliances would be of no real advantage. However, for cables used in transmission and distribution and telecommunication networks and also potentially cables used in buildings there could be a possible advantage in using a cable with a longer life. Replacing cables can be a time consuming process requiring significant resources, so in theory a cable with a longer useable life could be classed as being better for the environment. In practice whether a customer would pay more for a cable where any advantage only occurred after 40 years must be questionable.

Reduced Packaging and the Recycling of Packaging

Most cables are supplied on some form of reel or drum, although some smaller ones are also supplied in boxes. The cable industry has long looked at reducing the cost of packaging as a way of

saving money, but now reducing the amount of packaging can be sold as being better for the environment. Many companies now quote this as one way they are improving their “green” credentials. Companies need to ensure that the product is not damaged during transit, but reducing packaging is a win-win way of making a cable “greener”.

The other part of the cable packaging story is the reuse of drums. Large cables need to be supplied on sturdy drums, which are fairly easily reused once they have been checked for any damage. It is also possible to repair drums with minor damage so that they can then be reused. The cable industry has been reusing drums since long before this was considered of benefit to the environment, but often had trouble persuading their customers to return them. By playing the environmental card to persuade customers to return drums, coupled with the general increased focus on recycling it is becoming easier to get drums back for reuse.

One large cable manufacturer reported having used more than 280,000 drums in its global operations that had been collected and re-used one to five times over several years. This figure represented more than one-third of all cable reels used annually, and it corresponds to more than 94,000 m³ of sawn lumber or about 100,000 trees (45 hectares of forest saved each year).

Reduced Weight and Size

When we looked earlier at alternative conductors we touched upon the issue of cable weight. It can be argued that by reducing the weight of a product that there are savings to be had in terms of impact on the environment when transporting the product to the customer. There may also be advantages for some products, such as automotive cables,

during their use. The same can be said of size, with smaller cables easier to transport, and also potentially producing savings when installed. For a customer a lighter and smaller cable may well give cost savings, but it's hard to see many customers (other than vehicle manufacturers) paying more for a smaller and lighter cable just because it has less impact on the environment.

Impact on the Environment

In general the focus of a “green” product and its impact on the environment is normally centred on the materials used in manufacture and recyclability, but another point to consider is the visual impact cables, and in particular power cables, can have. This issue is most prominent when looking at high voltage transmission lines, with increasing resistance to the building of new overhead transmission lines, particularly in Europe. Thus it can be argued that underground HV cables are “green” cables in that they offer a more environmentally friendly solution than overhead lines. This can also apply to other types of cable which are normally installed in view and could potentially be hidden by using an alternative design.

Energy Efficiency

One area that has had some modest promotion is energy efficiency. Since all energy cables incur losses as a result of their resistance and reactance, in theory lowering these values would result in lower losses with an obvious environmental benefit. For most countries an important part of achieving a higher proportion of renewable energy generation is a reduction of losses. A simple way to reduce losses is to use a larger conductor size, and there has been some trend towards doing this with winding wire used in motors. Other design changes could potentially offer efficiency improvements, with for example a cable offering

better heat dissipation running at a lower temperature and thereby having a lower resistance, since resistance increases with temperature. This looks like an area where the cable industry could make a positive contribution to the environment with more work, although the impact on the environment of the need to extract more copper from the earth could be a counter argument to using larger conductors.

“Intelligent” Cables

Another area where the cable industry is looking to help improve efficiency is the use of equipment with distributed temperature sensing technology using fibre and sensors that allows for real time thermal monitoring of HV and EHV cables. The fibres are positioned in proximity to the power cables and can provide real time feedback to determine whether the cable is operating outside of established parameters and can pinpoint potential faults. Capturing these data allows utilities to address potential problems through preventive maintenance and avoid power outages. Utilities have learned that underground transmission lines using this sensing technology can safely have loads increased by high single-digit percentage points.

CONCLUSIONS

Since wire and cable is used in a very broad range of applications in all parts of the world, and it is a US\$180bn plus industry there is clearly plenty of scope for the cable industry to make a positive contribution to efforts to reduce the impact of mankind on the environment and to make the most of the earth’s limited resources. Most leading cable manufacturers now offer at least some products that are promoted as being better for the environment and also have initiatives under the banner of Corporate Social Responsibility to reduce their impact on the environment. In this article we have examined a broad range of areas where the cable industry is trying to be “greener”, and whilst it is clear that this is an area where there is much effort being expended, it’s hard not to see many of the initiatives as just good business practice. For example reducing energy consumption is something that will have a direct positive impact on the bottom line and ought to be something that any well run business strives to achieve irrespective of the impact on the environment.

The cable industry can’t be blamed for mainly promoting “green” initia-

tives that can also potentially improve profits since most cable markets are very competitive, with strong competition amongst suppliers and more than enough capacity to meet demand. In this environment introducing green policies that put a company at a competitive disadvantage are difficult to justify and only offering more expensive “green” products, without also offering cheaper less green alternatives would also be a risky strategy. Where the cable industry is certainly making a contribution is by offering more environmentally friendly innovative products and promoting the benefits of these so that cable users can easily choose to use “greener” cables. In our view the traditionally conservative cable industry is really waking up to the potential that innovative developments in the field of more environmentally friendly cables can offer, and companies that ignore this trend may find themselves at a disadvantage in the future. Educating customers as to the benefits of using “greener” cables will be a slow process, but we believe that this is the way that the market will develop, and cable companies that ignore this or lag behind do so at their peril.

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Non-hazardous
Hazardous &
Waste Use
Water Consumption
Emissions
Efficiency
Raw Material
Energy
Greenhouse Gas Emissions
Ozone-depleting Sub